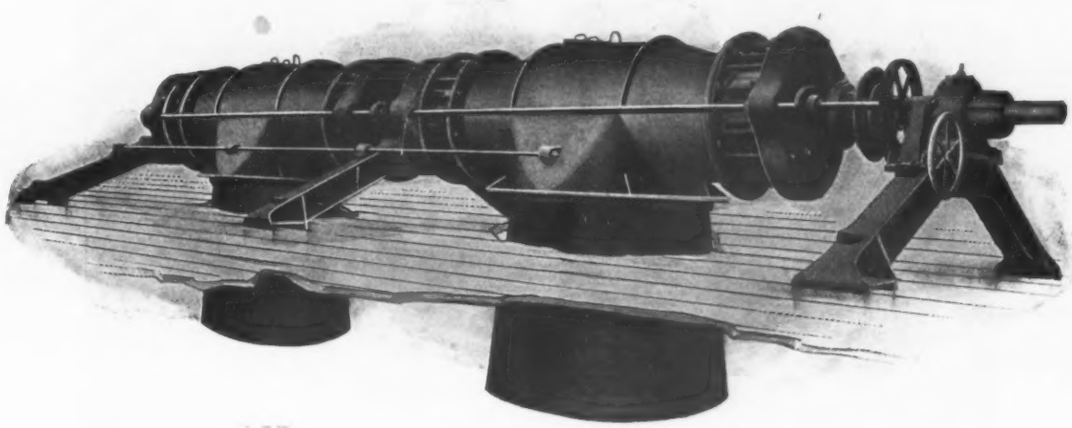
THE IRON AGE

THURSDAY, NOVEMBER 20, 1902.

The Jolly-McCormick Turbines at the "Soo."

The magnificent power station at the Sault Ste. Marie, which was put into commission a few weeks ago, is the largest example extant of the application and development of water power from a low head. While the preparatory work necessary to make this a successful installation did not call forth the combined skill and efforts of hydraulic engineers in all parts of the world, as did the Niagara Falls equipment, yet it took months of experiment and study before being perfected, and as installed has at least one point of advantage over its great rival, in that the efficiency of the turbines is far ahead of the latter. The type of turbine used in this equipment is the well-known McCormick turbine, which might well be termed the standard type in this country. When originally brought out the tests made on it showed it to be far in advance, in points of efficiency, power and speed, over any of the turbines then on the market.

The usual method of setting turbines has been to place the wheels so as to revolve in a horizontal plane, the shafts being vertical. With the advent, however, of expansion in the electrical fields, and the application of water power to the generating of electrical currents, it became necessary to set turbine wheels in a vertical position on horizontal shafts. When the Michigan Lake Superior Power Company prepared their plans for the new power house this setting was finally determined on as being the most economical, and proposals and plans were invited from turbine builders. Up to this time all tests of wheels had been made on a vertical step at the Holyoke Water Power Company's flume in Holyoke, Mass., which is at present the most



Pair of Turbines.

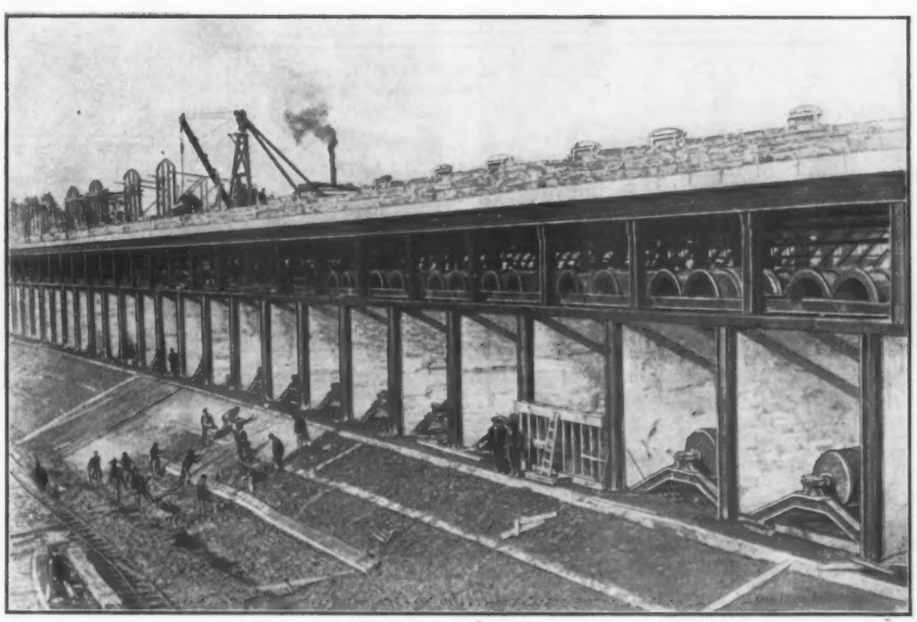


Fig. 2.—View of Forebay.

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reliable testing station, as it was designed by Francis and constructed by Clemens Herschel. This type of flume was used by Francis to obtain his formulæ for calculating water powers, which are authoritative today. To make tests on wheels in a horizontal setting required considerable expenditures, and an arrangement was finally entered into between the Power Company, the Webster, Camp & Lane Company, Akron, Ohio, and J. & W. Jolly, Holyoke, to design, build and test a turbine unit which should fulfill the following requirements: With a 16-foot head the unit must develop 568 horse-power at 180 revolutions, with an efficiency of 80 per cent., tests to be made at Holyoke under the supervision of Prof. G. S. Williams of Cornell University. After many months of experimenting with improved forms of wheels and various designs of draft cases and draft tubes, the final design, as illustrated by Fig. 1, was adopted. The best results finally obtained were as follows: Head, 16 feet; speed, 180 revolutions per minute; horse-power, 584; efficiency, 84 per cent. These figures speak for themselves.

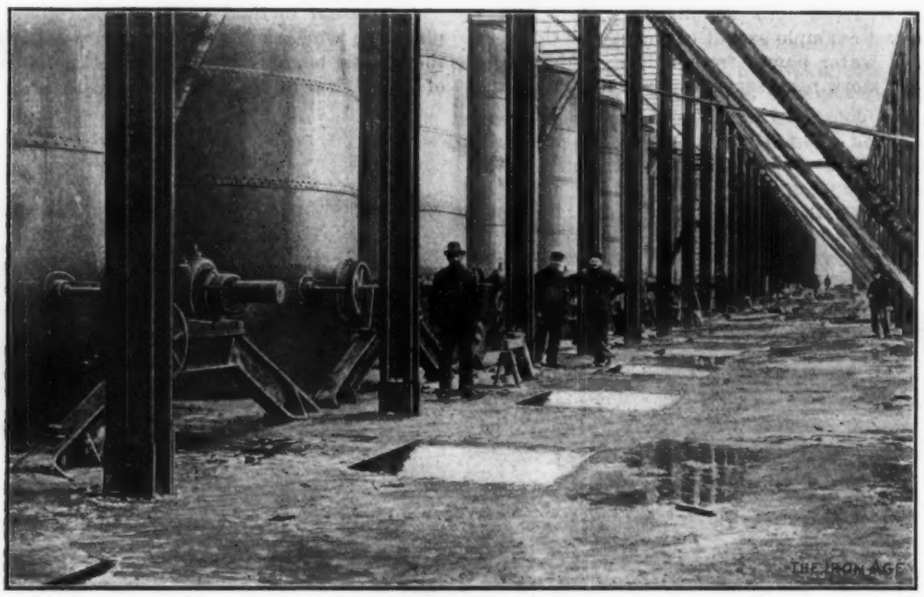

Fig. 3.—Dynamo Room.

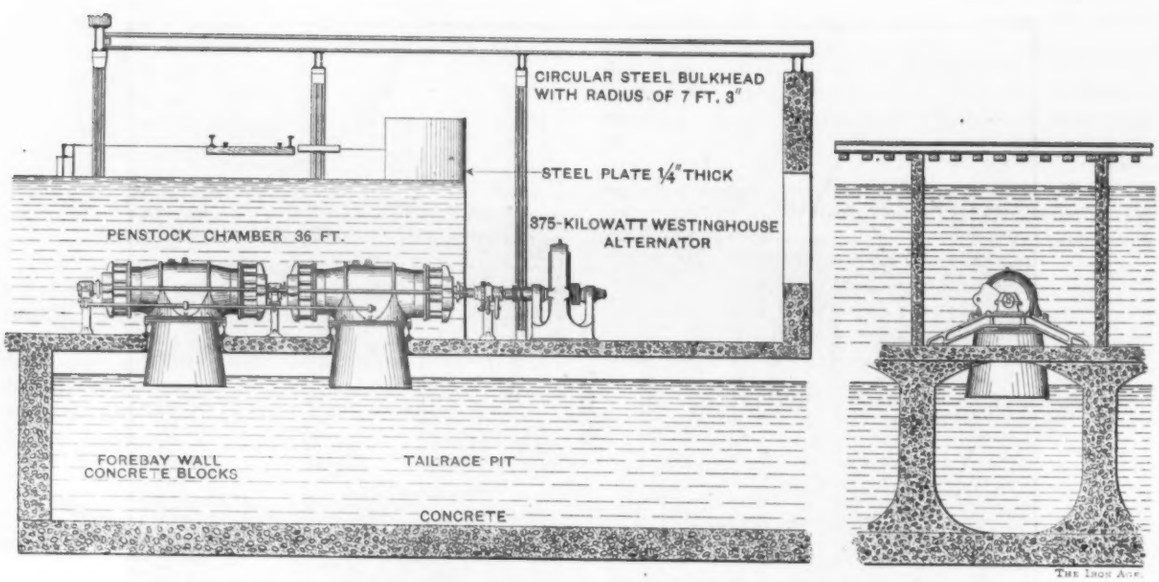

Fig. 4.—Elevation and Section of One Pair of Turbines.

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The penstock unit, as shown in Fig. 4, consists of four turbines arranged in pairs, with one draft tube for each pair. Each pair is keyed to an open hearth hammered steel shaft and the two shafts are bolted together by means of forged couplings. The shafts are designed to transmit double the power of the generators with the usual factors of safety. This is to provide against the torsional vibrations caused by generating an alternating current. Each pair of the turbines discharges into a central conical ended draft case, and the discharge is continued to the tail race by means of a conical steel plate draft tube. The draft cases are made of cast iron and are separable in a horizontal plane parallel with the turbine shafts, making them easy of access. The center of each case is provided with a yoke or steady rest for the turbine shaft. The combined water wheel shaft is supported by three heavy cast iron pedestal girders that rest on the side or foundation walls of the penstock. The water bearings are amply large and are made from specially prepared wood blocks. These are backed with iron and can be adjusted for wear. The draft cases are supported by heavy spanning frames made from 15-inch steel I-beams. These also

rest on the side wall of penstock. This construction frees the arches over the tail race from the weight of the machinery. The draft case and pedestal girders are tied together on each side by longitudinal bars, making a substantial and ideal support for the running parts. The turbine shaft penetrates the curved bulkhead by means of a stuffing box properly secured to the steel plates by rivets. The common horizontal gate shaft extends through the bulkhead into the dynamo room in like manner, and is provided with the necessary rigging to manipulate the gates of the four turbines simultaneously by hand or by machinery.

The turbine shaft at the end furthest from the dynamo room is 5½ inches in diameter and increases in size until it is 7¼ inches in diameter at the dynamo end, and is arranged to be coupled to the horizontal dynamo. Each of the four turbines is incased in a balance gate curb, while the individual gates are so poised as to direct the flowing water properly, and differently, at the

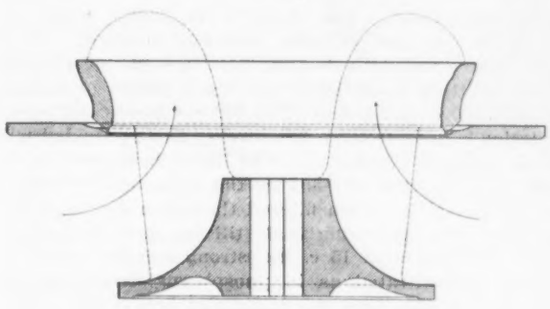

Fig. 5.—Cross Section of Turbine.

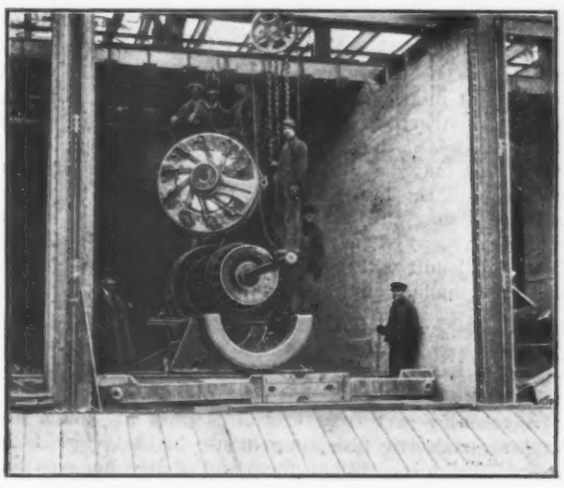

Fig. 6.—Erecting a Turbine in Penstock.

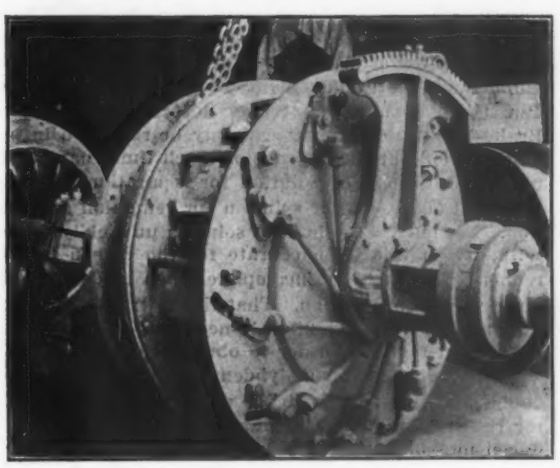

Fig. 7.—View of Turbine.

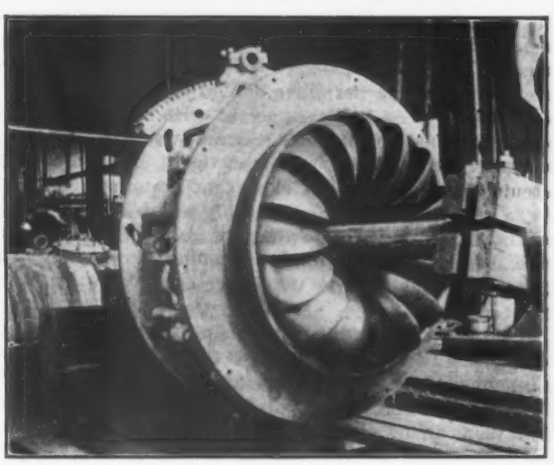

Fig. 8.—View Opposite Fig. 7, Showing Buckets.

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different degrees of gate opening, maintaining a high efficiency at part gate.

History of the Jolly-McCormick Turbine.

In the progress of any science or art, usually some one name becomes associated with its development that lends to it a stamp of genuineness in the public mind that no other name can impart. This is just as true in the development of turbine water wheels as in telephones, engines and pumps. John B. McCormick's name is familiar wherever first-class turbines are known. His early life as a raftsman on the Allegheny River, his preliminary work of developing several systems of turbines for various manufacturers, and his final development of a full series of tested patterns in the shops of J. & W. Jolly, are matters of history. The fact that he made as high as 18 sets of patterns for some of his turbines before being able to secure the desired results is not generally known; neither is it known that it took years to develop a full series of patterns, nor that these patterns have remained in the shops of the original owners, in Holyoke, Mass.

McCormick learned that a log could be drawn more readily through water butt first, requiring less power than if drawn top first. He learned that a stream or jet of water had its highest velocity in its center when not acted upon by other forces, and he was the first to recognize this in constructing and patenting a turbine bucket. He learned that whirls, eddies and cross currents recklessly ignore any formulæ that are usualy developed for their guidance; he also learned that a pattern perfect in shape for one size of runner could in no way guide him to a pattern for a larger or smaller size. So he patiently developed his patterns one set at a time, until they would produce a turbine satisfactory to him. His work was then only half finished, as it was necessary to make a second set of patterns for turbines to turn in the opposite direction. These full series of patterns, with the data pertaining to their exact positions in the turbine structure, constitute the stock in trade as far as patterns go. No published formulæ or system of measurements exist from which a McCormick turbine can be made, and his private formula was, in each case, a turbine that will furnish 25 per cent. more power at a higher speed than any competitor's turbine, and at above 80 per cent. efficiency.

To incorporate this turbine into the more modern power house has developed new problems. The question of government was not of prime importance with McCormick; hence the experience of specialists in the way of governing gates has been added to this turbine. McCormick's tests were made on vertical steps, while

modern practice is inclined toward mounting turbines on horizontal shafts, usually in pairs. This practice, while ideal in construction, has not always been satisfactory from a power point of view; in fact, some very large installations of this kind have fallen from 10 to 25 per cent. short of their proposed power. The Michigan Lake Superior Power Company were cognizant of this fact and made use of it in their selection of Jolly-McCormick turbines mounted in draft cases designed and built by the Webster, Camp & Lane Company, Akron, Ohio.

There are some essential principles in draft tube construction that are overlooked in ordinary turbine building. Past experience has clearly demonstrated that vertical step turbine tests will not hold in horizontal settings, unless correct construction is used in the whole system. It might be added that it is possible, through faulty construction, to develop no power from water that has passed the turbine, while, on the other hand, the water may be made to yield power even after it has reached the lower level or tail water. (The latter statement may provoke a smile in the novice, but it will wear away with reflection.) A close inspection of the "Soo" unit will convince that some radical change has been made from common practice.

Electric Fire Pump in Rouen.

A recent report from Consul Haynes at Rouen describes an electric fire pump in use in that city. It is composed of a centrifugal pump and of an 8 horse-power motor, which gives normally 2000 revolutions per minute. A continuous current of 525 volts can be applied. This motor is well covered, so as to prevent all penetration of water. Above are two bobbins: On one is wound the wire upon which the current is received, the extremity being exposed in such a manner as to allow connection with a hook suspended from the tram or electric light wire; on the other bobbin is wound the return wire, the free end being connected with a cast iron block to be fastened to one of the tramway rails. There is beneath the covering a compartment containing two circuit breakers, a circuit closer and commutator.

To start the apparatus it is only necessary, after connecting the two wires to the line giving the energy, to close the circuit and start it running slowly with the rheostatic guide. The time necessary for starting is about a minute.

The bobbins on which are wound the conductors can receive 656 feet of insulated wire; if to this is added the 200 meters of hose on the reel and the 114 feet to which the water can be thrown, it is seen that a distance of 1427 feet can be covered. The distance that the water can be thrown, nearly 115 feet, is accomplished with an orifice of 0.7 inch and a volume of 92 gallons a minute.

The whole machine can be placed on a hand cart, or on a little two wheeled wagon drawn by one horse. Its total weight, with accessories and two men on the seat, is about 2292 pounds. The motor and pump are not longer than a meter, and about ½ meter wide and ½ meter high. Behind the machine is a reel capable of holding 984 feet of hose, two lances, a ladder with hooks, an axe, a hydrant key, a nozzle, &c. The weight of this reel, equipped, is 727 pounds.

The idea of this pump, which is the only one of its kind in France, if not in the world, was suggested to M. Robert Lefebvre, the captain of the Rouen Fire Company, by a conversation he had last year with a German engineer at the Berlin Fire Extinguishing Exposition. This latter had conceived the idea of an electric pump for cleaning the walls of buildings, &c. If sand thrown by an electric pump could clean buildings, why could not water thrown in the same manner extinguish fire? In the solution of this question the electric fire pump was born.

The Engineers' Club of Philadelphia will celebrate its twenty-fifth anniversary at a banquet at the Union League on the evening of Saturday, December 6. An interesting programme is being arranged for this occasion.

The Rapid Determination of Molybdenum in Steel.

BY GEORGE AUCHY, TACONY, PHILADELPHIA.

For the determination of molybdenum in steel, the writer some time ago proposed the very obvious method of separating from iron by caustic soda and reducing with zinc and titrating with permanganate. Since that time several improvements in carrying out the details have suggested themselves, and the method now used is as follows:

A blank or dummy test must be made as follows: 0.8 gram of drillings is treated with a mixture of 15 c. cm. dilute nitric acid, 10 c. cm. concentrated hydrochloric acid, and 3 c. cm. concentrated sulphuric acid and the liquid in a covered porcelain dish boiled down over the full flame of a Bunsen burner to the appearance of fumes. The fumes must be very dense. The cover must afterward be removed and thoroughly dried by itself. The residue is then boiled up with 50 c. cm. water; allowed to cool; poured by degrees and with shaking into 100 c. cm. of a caustic soda solution made by dissolving 1 pound of soda in about 2100 c. cm. water. The 100 c. cm. of caustic soda solution is in an 8-ounce Erlenweyer flask, provided with a file mark at 200 c. cm. The liquid is diluted to this mark, well mixed by shaking the flask, and allowed to stand till settled; then filtered through a dry filter into a 100 c. cm. measuring flask till the mark is reached; then acidified with 15 c. cm. strong sulphuric acid, reduced and titrated as in phosphorus determinations. Worked in this way the method is one of the easiest and most accurate of technical analytical processes.

Brakes modifies Copp's acid sulphate fusion method by omitting the fusion and obtaining the steel in sulphuric acid solution by evaporation to fumes. The advantage of this plan over Copp's procedure is obvious. It also has the advantage over the writer's method that ammonia is more convenient to use than caustic soda. But there is a very serious defect connected with Brakes' method—one that can only be remedied in part, and that only at the expense of much time—namely, the use of 1000 c. cm. of solution for separation and filtration and 500 c. cm. of solution for reduction and titration. Not only is the bulk of solution unwieldly to work with, but it is also inaccurate for the reason that the reduction is apt to be incomplete when made in such a large volume of solution. That this is true is proved by the fact that Brakes finds it necessary to use the old Emmerton factor in order to obtain true results. With a low percentage of molybdenum, he would, without doubt, find that even with the use of the Emmerton factor results would be too low. The stability of the reduced molybdenum solution is in proportion to its concentration. Simple dilution will instantly change the green MO_2O_3 solution into the port wine $MO_{12}O_{19}$ solution. The obvious remedy would seem to be to make the separation in small bulk, as does the writer in the caustic soda method. But unfortunately this cannot be done, as the separation is in that case not a complete one when ammonia is used.

This is shown by the following results:

In these tests 25 c. cm. of solution of steel were poured into a mixture of 100 c. cm. strong ammonia and 50 c. cm. water; diluted to 200 c. cm., filtered, and 100 c. cm. taken for reduction and titration, after boiling off excess of ammonia. Results by the caustic soda method described in this article are also given.

Molybdenum present. Per cent.	Ammonia method.—Separation in small bulk of solution.—Molybdenum found. Per cent.	Ammonia method.—Separation in large bulk, reduction and titration in small bulk.—Molybdenum found. Per cent.	Caustic soda method as above described.—Molybdenum found. Per cent.
9.90	8.90	10.00	9.90
9.90	8.80	9.80	9.90
9.90	8.80	9.70	9.80
9.90	8.50	....	9.90
9.90	8.90	....	9.80
9.90	....	....	9.90
4.95	....	....	5.00

The Electric Smelting of Iron Ore.

BY A. J. ROSSI, NEW YORK.

Electro-metallurgy has already taken such a prominent place in the manufacture of many chemical or metallurgical products and in the separation of metals or the production of their alloys that it was but natural that the thoughts of engineers should have been directed to the electric smelting of iron ore to obtain pig iron and, as some claim to or have done, even steel. Numerous patents bearing almost exclusively on special arrangement of the furnaces have been secured. Some have been experimented with, and to a certain extent successfully.

The most sanguine have gone so far as to predict a sort of revolution in the iron industry in the near future (on a small scale); others, more skeptical, have unhesitatingly foreshadowed a dismal failure, on the score of economy if nothing else, when the electric process is to compete with the much abused blast furnace. We will class ourselves among the "opportunists" and those, more reserved, who consider that the question is well worth an impartial discussion either as to its possibility or as to the limits of successful operation.

As is often the case in such matters, experts do not agree. It seems to us that the advocates of both systems have gone too far. We propose in the following to set forth what we think could legitimately be expected from this electric smelting of pig iron, at least in the present state of the arts, basing our deductions on an examination of what has been published on the subject, choosing only the more authentic and reliable cases as based on sound scientific discussion, and stating the results obtained by ourselves, not experimentally, but on a scale sufficiently important to be called industrial, since we smelted iron ores for pig iron, as a sort of incident of other manufactures, day and night in a continuous manner for weeks at the rate of about 1 ton or over per day.

Questions Involved.

The question of electric smelting may be considered under the following points:

1. Is it possible to treat directly in any electric furnace iron ores, magnetites, hematites or carbonates, so as to obtain from them cast iron, in a practical if not an economical manner? All metallurgists, we believe, will answer yes on this point without hesitation. It does not require discussion. It has been done by many and we have done it ourselves.

2. The possibility of this electric treatment once admitted, is the product obtained of as good quality as the one obtained from the smelting of the same ores in the blast furnace? On this score also the answer may be considered as affirmative. As far as we are personally concerned, we indorse this view without reserve, the price at which one can dispose of an article being for us, and as it will be admitted by all, a good criterion of its value.

3. Can the economy of such electric treatment of iron ores be compared to that of the blast furnace process and can it be of as extensive application as the latter? This is the fundamental part of the question.

Arguments in Favor of Electric Smelting.

In experiments carried out in Germany a few years ago with the process known as the "Taussig Process," the inventor claimed that pig iron could be manufactured with a plant equipped with 500 to 600 horse-power, using good iron ores containing 48 to 50 per cent. iron, at a cost of $9.65 per ton, assuming the price of ore to be $2.40 per ton, and that this price could even be very materially lessened with a large plant when operating with an electric power not less than 1000 horse-power. All this estimate is based on experiments made on a very small scale, with a power of about 20 horse-power. At the price at which pig iron was sold at the time (1894), assuming even the cost of electric smelting per ton to have been really what the inventor stated or hoped for, there was not much margin for profit, if any, but, for that matter, there was not much profit in the case of blast furnace smelting.

The pig iron obtained electrically proved to be of excellent quality, tests made of it at the Royal School of Mines of Berlin having given such results as 3410 kg. tensile strength for a round bar 10 mm. (0.39 inch) in diameter, which corresponds to 28,560 pounds tensile strength per square inch. A report on these experiments and tests having been made to the Department of State at Washington by Frank H. Mason, Consul-General of the United States at Frankfort, they seem authentic and for this reason we have quoted them.*

More recently, in an article on the same subect, which appeared in 1901 in a French publication, "The Echodes Mines et de Metallurgie,"† the statement is made that three electric furnaces, of 500 electrical horse-power each, have been erected in the valley of Canonica in Southern Italy (were to be is probably more correct), for the manufacture of pig iron under the Stassano patent, which bears, like the preceding, on some of the arrangements of the furnaces. The conclusions of the article are that in order to obtain a metric ton (1000 kg., or say 1 gross ton of 2240 pounds) of pig iron per hour 3000 horse-power are required, the cost of the horse-power being 18 francs, or say $3.50, per gross ton of pig metal per hour, or 24 tons per day.

If we take this figure, 3000 horse-power hours per gross ton, it gives 1 pound of pig iron per hour for each 1.33 horse-power expended, or 0.75 pound of pig iron per horse-power hour. Details of the Stassano process have appeared in sundry technical publications abroad and have been more or less reproduced in the scientific press of this country. Leaving aside all questions relating to the peculiar construction of the furnaces as not germane to our subject, at least directly, we may retain from these descriptions the following: Calculations of the amount of heat necessary for the reduction of the ores, the fusion of metal and slag, &c., are taken to give 2000 calories per kilogram, equivalent to 3600 thermal units per pound of metal smelted; that in fact, based on an experiment made with 100 horse-power, 2780 horse-power should prove sufficient per metric ton hour, so that 3000 horse-power is ample for the purpose. It appears indeed from an actual test which, it is said, was made of the process in an experimental furnace of 100 horse-power, the energy being supplied by two dynamos of 300 horse-power each at a potential of 50 to 60 volts, that, the furnace having been preheated by passing the current through for 20 minutes before introducing the charge, there were obtained 8 kg. of pig iron in 35 minutes, at an expense of energy of 2.70 horse-power per kilogram, which corresponds to 1.23 horse-power per pound hour, or 2780 horse-power per gross ton day, assuming 1 kg. equals 2.204 pounds.

We might quote many other examples of tentative electric smelting, but the above will suffice for our present purpose, as establishing beyond contest, at least, the first three following points:

1. That pig iron can be smelted from ores in an electric furnace.

2. That the quality of the product is fully as good as that of the best pig iron obtained in the blast furnace.

3. That an electric horse-power could certainly be obtained at a cost of $3.50 hour for 3000 horse-power; that is, of $0.03744 per horse-power day, or $13.40 per year.

4. As a mere estimate, based on a test of one hour in special conditions, that such a favorable figure as 3000 horse-power per gross ton hour was considered as sufficient, which corresponds to 0.75 pound of metal per horse-power hour, or 1 pound of pig iron for 1.33 horse-power hour. The calculations from which these deductions were made do not appear to us to have been made on a very sound basis, nor the practical conclusion arrived at sufficiently justified by a test of one hour in

* Communication by Frank H. Mason, Consul-General United States at Frankfort to the Department of State, April 26, 1894

† "Echodes Mines and Metallurgie." Reproduced in part by *Engineering and Mining Journal*, October, 1901, Vol. LXXII, No. 16, p. 489.

the circumstances mentioned. But, such as they are, these figures can form the basis of the discussion which is to follow and for this reason we will retain them.

Arguments Against Electric Smelting.

In an article which appeared in 1901 in *The Engineering News* there is an elaborate discussion of the subject on a more scientific basis and presenting the question in its proper aspect. Although we take exception to the sweeping conclusions of the author, we do so not on account of the figures that he gives and which are certainly too low and more than conservative, but because they cover only a part of the elements which enter into the making of the cost of manufacturing iron and have a bearing on the comparative cost of the product as obtained by the two different processes, blast furnace and electric smelting.

Broadly stated, the author correctly claims that, in order to decompose the oxides of iron of an iron ore, impregnate the metals with such other elements, carbon, silicon, sulphur, &c., as enter in its composition, and such other items as are well known to metallurgists, it is necessary to generate and supply a certain amount of heat; that heat and power being interchangeable, this amount of heat corresponds to a certain amount of horse-power or mechanical energy in a given time and that it is immaterial if this heat appears as fuel burnt in the blast furnace or electric energy developed, all of which statements are irrefutable. He states that in order to reduce 1 pound of iron from its oxides it is necessary to supply 3396 thermal units and to make pig iron, with such contingencies as have been mentioned broadly, 4000 thermal units per pound of pig metal, or per ton of 2000 pounds 8,000,000 thermal units. One horse-power being equal to 33,000 foot pounds per minute, or to 1,980,000 foot pounds per hour, equals 47,250,000 foot pounds per day. This, divided by 778 foot pounds per thermal unit (figure which he adopts as the mechanical equivalent of 1 thermal unit), corresponds to 61,080 thermal units per horse-power day. Since we have to supply 8,000,000 thermal units in order to make 1 ton of pig iron (2000 pounds) a day, we want 131 horse-power. This is equivalent to 3144 horse-power per ton of 2000 pounds hour, or 3521 horse-power per gross ton of pig iron hour, instead of the figure 3000 horse-power, mentioned and estimated in the Stassano process and this, he adds with perfect right, supposing the furnace to work theoretically perfect; that in fact, we may add, the ore would yield all that it can theoretically produce of metal without losses of any kind.

In good modern practice 1 ton of coke per ton of pig iron is considered a very satisfactory figure. At $2.50 a ton this makes for fuel per ton of pig iron by the blast furnace process an expense of $2.50. In the electric furnace the corresponding energy, 131 horse-power a day, at $20 a year per horse-power, a figure considered by the author to be a minimum, corresponds to $0.0548 per horse-power day, or to a daily expense electrically of $7.29 per ton. Hence, concludes the author: "Even if a process of electric iron smelting could be developed, operating nearly theoretically perfect, it would be only a laboratory curiosity, since its cost of operation under the most favorable circumstances would be several times as great as the cost of the present methods of reduction by the combustion of fuel in the blast furnace."

Yes, if the cost of fuel as compared to that of the electric energy were to be the only element of economy of such calculation, and even so if the cost of the electrical horse-power is $20 a year. But were the horse-power to be worth only $2.50 a year there would be equality between the two methods of smelting working under the same conditions and leaving out all other items entering in the final cost and not considered by the author.

Discussion.

The elements of heat expended or to be supplied in the blast furnace may be enumerated as follows:

Reduction of the oxides of iron of the ore, also of a part of the silica, alkali metals, sulphur, phosphorus, of which the radicals enter into the composition of the product.

Fusion of the pig metal.

Fusion of the slag.

Losses in the gases escaping at the top and only partly utilized for heating the blast.

Vaporization of the moisture of ores, fuel and fluxes.

Decomposition of the carbonates of the ores (if any) and in all cases of the limestone used as flux.

Vaporization of the moisture of the air blown in through the tuyeres.

Cooling by the tuyeres.

Losses by radiation.

Some of these items need not be considered in electric smelting and others only to a much smaller extent. Many of them depend on the composition of the ores in each case. With such ores as would be contemplated to be smelted electrically, the amount of slag may widely differ. It is clear also that such loss of heat as is carried away by the tuyeres or the volatilization of the moisture of the blast in the blast furnace need not be considered in the electric furnace; incidentally the amount of carbonate of limestone to decompose is smaller in an electric furnace by all the quantity required for the ashes of the fuel, or at least two-thirds of it. The heat carried away by the gases escaping at the top of the blast furnace is another important item of loss which does not exist to the same extent, if at all, in the electric furnace, the carbon required being only such as is necessary for the reduction of the oxide of iron and not being more than one-quarter to one-third of the quantity which figure in the charges of the blast furnace, assuming in the latter only 1 ton of fuel per ton of iron; no air is purposely introduced in the electric furnace, still less blown in with its moisture to be vaporized.

We find in Ledebur's "Metallurgy" that the heat expended per kilogram of white pig smelted in the charcoal furnace of Voldenberg, the blast being heated to 300 degrees C., and blown in at the rate of 215.20 c. m. per kilogram of pig iron, the furnace producing 15 tons a day, amounted, by calculation, to 2726 calories per kilogram, or 4907 thermal units per pound. The heat strictly required for the reduction of oxides, fusion of metal and slag figuring at 2382 calories; that carried by the gases at top to about 188, and that carried away by the vaporization of the moisture of the blast and losses at the tuyeres to about 6 per cent. of the whole 2726 calories. If we omit the latter as strictly peculiar to the working of the blast furnace we come to 2680 calories per kilogram, equivalent to 4680 thermal units per pound, or some 17 per cent. more than the 4000 thermal units assumed by the writer of the article alluded to. The calculations of Ledebur show, by the other side of the balance sheet, that some 93 to 95 per cent. of the heat supplied was accounted for in this case. Expressed in another form for comparison with the electric process, the yield was only 93 per cent. of what it might have been theoretically, had all the heat proved effective.

On the other hand, in the Ormsby furnace, running on gray iron, capacity 584 c. m., production 63 tons per day, blast at 780 degrees C., gases at 412 degrees, ores 40 per cent. of iron, Ledebur calculates that 3887 calories per kilogram, equivalent to 6990 thermal units per pound of cast iron, were required, instead of 2726 calories in the Voldenberg furnace. This figure represented only 87 per cent. of the total heat (4448 calories) as calculated by Ledebur on the debt side of the balance sheet, which, for our purpose of comparison of the two methods, may be expressed by saying that the yield was only 87 per cent. of what the heat supplied could have theoretically yielded. In other words, this balance of heat in a blast furnace cannot be assumed *à priori* for the purpose of comparison, it may vary widely with the composition of the materials entering the charge. The physical state of the ores has also a great deal to do with the matter; ores absolutely unfit for blast furnace use on this score are, on the contrary, eminently well adapted for the electric furnace.

Assuming, from Ledebur and other metallurgists, 1796 calories for the reduction of 1 kg. of oxide of iron (ferric

oxide, Fe_2O_3), 1900 calories per kilogram of pig metal impregnated with silicon and other usual elements found in pig iron, 300 calories per kilogram for the fusion of 1 kg. of gray pig, 375 calories for the decomposition of 1 kg. of average carbonate used as fluxes and also present in the ores in some cases, and that 1 calorie equals 4 thermal units, 1 kg. equals 2.204 pounds, 1 horse-power equals 640 calories equals 2560 thermal units, let us make the calculation similar to that quoted from Ledebur of the heat which, theoretically, would have to be expended for the reduction of an iron ore such as the one we have smelted electrically for weeks in succession, omitting, however, in the estimate such items as refer essentially to the peculiarities and requirements of blast furnace working as previously observed.

This ore, on an average, contained 57 per cent. of iron, which corresponds to 80 per cent. ferric oxide, so that there were 20 per cent. of gangue to go to slag. To 100 kg. of this ore were added, as flux, 15 kg. of limestone containing about 7 kg. of lime, magnesia, &c., so that the slag could be expected to amount to 20 + 7 = 27 kg., and the carbonates to decompose to 15 kg. Now, 57 kg. of iron in ore corresponds to about 60 kg. of pig iron estimated to contain on an average 95 per cent. of iron, the balance being silicon, carbon, &c. We have:

	Calories.
Reduction of 60 kg. of pig iron × 1900 calories	114,000
Fusion, 60 kg. pig metal × 300 calories	18,000
Fusion, slag, 27 kg. × 500 calories	13.500
Decomposition, 15 kg. carbonates × 375 calories	5,625
Total	151,125

for 60 pounds of metal, or 2520 calories per kilogram, equivalent to 4536 thermal units per pound, but this supposes that all the heat, equivalent to the mechanical energy of the current, has been effective without losses of any kind either as heat itself or as to production of metal by incomplete reduction of the ore and consequent loss of iron in the slag. We may remark here that if to this figure of 4536 thermal units per kilogram we add 6 per cent. as representing items peculiar to blast furnace smelting, we find 2670 calories per kilogram equivalent to 4808 thermal units per pound, as compared to the 4000 thermal units estimated by the writer of the article. This examination shows clearly that the figure he has assumed is, as he states, almost a theoretical one, not to be expected in practice. In fact, with the ore last mentioned, we find that 4808 thermal units per pound of pig iron would be all that could be obtained theoretically in a blast furnace, and 4536 thermal units per pound all that an electric furnace, working perfectly, could give.

Results Obtained in Practice.

If we now turn to the results of actual practice, continued day and night for weeks, such as we have obtained with a current of 200 horse-power, smelting, electrically, pig iron at the rate of over 1 ton a day, as a special by-product, so to speak, of other manufacture, the current not being estimated, but carefully measured with proper instruments and recorded daily for the electric power company who furnished it and were charging for it, we find that under favorable conditions we obtained from the ores, of which the composition is given above, a yield of 87 per cent. in metal and an average yield of 80 per cent. under ordinary circumstances of running. We should remark, however, that our furnaces were not well adapted for the purpose of running continuously because they had been originally built for intermittent running. The metal was tapped at regular intervals, as with a blast furnace, though much more frequently, the size of the furnace, which we had to take as it was, not allowing the accumulation of more than a fraction of a ton in the hearth proper.

Under these conditions, reckoning on the 200 horse-power supplied, we required per kilogram of metal obtained from weighed charges 2900 calories in the best runs (87 per cent.), or 5220 thermal units per pound, a figure likely to be obtained regularly with a better constructed apparatus, and, under our less favorable conditions, as general average, 3150 calories per kilogram, equivalent to 5670 thermal units per pound.

Now since 1 horse-power equals 640 calories equals 2560 thermal units, the above figures correspond with 87 per cent. yield to 2 horse-power per pound hour, or ½ pound per 1 horse-power, or 186 horse-power per gross ton of pig iron in 24 hours, and with 80 per cent. yield (general average of ten weeks of running), 220 horse-power per pound hour, or 0.454 pound per horse-power hour, or 200 horse-power per gross ton in 24 hours.

In short, we are justified, based on these absolutely practical results, which include losses of all kinds, by radiation, by imperfect insulation, by incomplete reduction of the charges and passage of oxide of iron in the slag (results which, in fact, represent the net yield of a given amount of ore under the action of a measured energy), to consider 200 horse-power per gross ton day as a practical figure easily obtained under indifferent conditions of apparatus and working, and one which might likely be expected to be bettered and brought to possibly 180 horse-power under more favorable circumstances. It is the higher figure, 200 horse-power per gross ton a day, that we will adopt as a basis in the comparisons of the two processes of smelting which we will make later.

All that we have said above, relating of amount of calories required per kilogram of pig iron smelted, may be *résuméd* in a tabulated form as follows:

Table I.

	Thermal units per pound of pig iron.	Pounds of pig iron per horse-power hour.	Horse-power per pound pig iron hour.	Horse-power per gross ton in 24 hours.	Observations.
Calculations made on the Stassano process (a)	3,645	0.750	1.33	125	Estimated and considered as confirmed by a test of one hour on a few kilograms.
Calculated by the author of the article in *Engineering News* (b)	4,000	0.636	1.57	146	No allowance.
Same as (b) with an estimate of 85 per cent. yield (c)	4,700	0.541	1.84	171	Yield of 85 per cent. only estimated from one practical running.
Blast furnace calculation of balance of heat by Lebedur (d)	4,750	0.550	1.85	172	Voldenberg furnace, 25 per cent. of heat accounted for in balance sheet.
Blast furnace same as (d), calculated by Ledebur; 87 per cent. heat acounted for (e)	6,996	....	...	255	Ormsby coke furnace, 87 per cent. of heat only accounted for on balance sheet.
Same as (e), assuming that all heat in blast furnace would have been accounted for (f)	6,086	....	...	222	Ledebur-Ormsby coke furnace, all heat accounted for.
Calculated by us for the special ore mentioned, on the same basis as in blast furnace (g)	4,808	0.551	1.88	173	All heat in blast furnace accounted for theoretically.
Practically obtained by us as a result of day and night runs for weeks; good runs 87 per cent. yield with same ores as (g) (h)	5,220	0.500	2.00	186	All charges weighed, as also metal obtained; current measured with proper instruments; electric furnace.
Same as (h); average of good, bad and indifferent runs for the whole run of ten weeks in electric furnace	5,670	0.467	2.14	200	Do.

In our furnaces, operating as they did and constructed as they were for a specific purpose, the gas escaping at the top was carbon monoxide, which began to burn to carbon dioxide only when close to the top. It was formed in place by the burning of the particles of carbon at the expense of the oxygen of the oxide of iron of the particles of ores, which were intimately mixed with those of carbon. The furnace being open, the heat thus generated by the combustion of CO to CO_2 was practically lost. That it might have been utilized to prepare the charges for reduction as they were fed into the furnace is evident. To a certain extent this

was secured in a crude manner, but not to the full heating value of the gases and in a much less effective manner than in a blast furnace. In the latter apparatus there is also a serious loss on this score of the heat carried away by the escaping gases and still available after the preheating of the blast, but we doubt if the heat from the escaping gases in our furnaces, as constructed for specific purposes and not specially for iron ore smelting, was utilized any further than to compensate for the losses by radiation. On this score, then, there would be a legitimate hope of obtaining somewhat better results as to horse-power consumption per gross ton in 24 hours than that assumed—viz.: 200 horse-power per gross ton.

Cost of Power.

The figure of $20 per electrical horse-power per year, which the writer of the article mentioned considers a minimum, may be called, on the contrary, almost a maximum. The current can be had at $18 per year in many places and has been offered to us at $15 for moderate amounts and at as low as $12.50 for several thousand horse-power. In certain districts as low a price as $10 per year could be obtained, and where it would be produced in place by the parties utilizing it at cost price or nearly so, certainly a figure of $8 per horse-power a year or even less does not appear to be too low. We have seen that in Italy it could be secured at a cost of $13.50 per year for 3000 horse-power.

It is one of the elements of the comparison of the relative economy of the two processes which the writer of the article does not seem to have taken into consideration in his conclusions. It is also obvious that an electric plant would not be established in competition with a blast furnace in a district where ores, fuel, fluxes would have to be transported from a long distance at a great cost, but, on the contrary, at the very places where ores could be had on the spot at the cost of mining, so to speak, and where the electric power could be bought or created at a reasonable price. In many districts a local industry would be justified under advantageous conditions of prices of ore and current, especially in such districts where the cost of transportation of pig iron made in blast furnace for general use becomes an item of great importance, in fact is almost prohibitive, and where coal may be of such quality as not to be fit for blast furnace purposes. We were told by parties on the Pacific Coast that the freight charges on pig iron by railroads amounted to $10 a ton in some places. Even were it to be much less, were ores to be had in these regions (as they are) at a low price, and the parties we refer to told us they could be had at 50 cents per ton at the electric furnace, and that coal unfit for blast furnace was found in close proximity, would not these favorable circumstances justify electric smelting, though they would exclude a blast furnace treatment? Water power, we were told, could also easily be made available for electric purposes at the cost of creating it. To be economical a blast furnace must be of certain dimensions; an electric furnace, within wide limits, can be made of any dimensions desired or the furnaces multiplied. The economy lies in the power available and not in the size of the smelting apparatus.

In the northern districts of New York and in many other States of the Union, there are large deposits of ores which, on account of present lack of means of communication, if for no other reason, are excluded from the general market; such, for instance, are the ores that we have smelted both in the blast furnace and electrically. They did yield, in both cases, an iron of superior quality, particularly well adapted for specific purposes and for which we have obtained a special price. They are rich in iron (57 to 60 per cent. iron) and practically free from phosphorus and sulphur. They can be mined in open quarry for many years to come and could be delivered, we were told by the owners, at 50 to 75 cents per ton at the electric furnace (all included); charcoal, as reducing agent, is at hand, and limestone is within carting distance. Water power to the extent of possibly 20,000 horse-power could be cheaply and easily developed in these mountain ore districts. Would not, under these conditions, an electric furnace solve the present difficulties, specially if, by the smelting of these particular ores, having peculiar characteristics, a pig metal commanding a better price on the market can be and in fact has been obtained from them? It is easier to build up a railroad spur for a manufactured product than one to transport all the raw materials necessary for a manufacture.

We do not claim that an electric furnace or plant could be established and worked profitably anywhere or near our monster modern blast furnaces producing 500 and 700 tons per day or more; nor, at least in the present state of the arts, that they can be made of the same proportions as these metallurgical colossuses; nor that an electric installation could compete with a blast furnace with materials, ores, fuel, stone, delivered at the same price at both plants unless the electric power could be delivered at a figure lower than we can now expect; nor that, under conditions of approximate equality of cost, the electric installation should in all cases be necessarily preferred, but a power of some 5000 horse-power can be developed at a comparatively moderate price in mountainous districts and others favorably located. Electric smelting does not require the complicated and expensive machinery and apparatus of a blast furnace, nor does it require, excepting the electrician in charge of the plant, particularly skilled labor.

In other words, we do not hold that all the blast furnaces are to be replaced by electric plants, but we claim that favorable local conditions of labor, of the supply of ore and other materials, of the electric power and of reaching markets may justify profitable work by electric smelting. Another of its advantages is that, in case of trade depression and unprofitable prices, it is enough to throw off a switch to stop the works and that manufacture can be resumed at once by turning it on again without any special outlays. The addition of a few extra furnaces at a small cost allows even an increase of output if justified by the demand; furnaces which can be built at a short notice. We believe, then, that under certain contingencies the cost of electrically smelted pig iron may be as low as or materially lower than that of pig iron obtained in a blast furnace.

Comparison of Cost of the Two Processes.

Let us then assume that where such an electric plant should be established, for a production of say 30 to 50 tons of pig iron a day, we have an ore of 57 per cent. of metallic iron, general average of mine; of limestone at $1 a ton, coke at $2.50, the ore being delivered at the electric furnace at 75 cents a ton, a price which has been made to us and even a lower one in certain districts. Let the price of current be $10 a year per horse-power (for 365 days of 24 hours). This cannot be considered too low a figure for generating the current at cost price for its own use, thus not requiring the costly establishment rendered necessary for the storing and regular distribution of the current to sundry customers. In fact, in certain districts the current is offered at that price by power companies.

The amount of limestone required in the case of electric smelting can certainly be taken to be the same as for the same ores smelted in a blast furnace; if anything it should be less, because we need not take in consideration the ashes of the fuel to the same extent to which is has to be done in the blast furnace. The fuel (carbon in some shape) used for the electrical reduction of the iron oxides, amounting to say one-quarter to one-third of what is required in the blast furnace. The labor, incidentals, superintendence, &c., in a blast furnace certainly vary with the daily production. These items are generally estimated at about $2 per ton and less as the output increases. It need not be any higher in the electric furnace, at any rate, and for the comparison of the two methods the figure adopted is of secondary importance.

Half a ton of limestone of average composition per ton of pig iron should be considered ample in both cases with such rich ores as we will assume to be smelted—that is, Bessemer ores at about 57 per cent. of iron. Such ore would give per 100 pounds, estimating the pig iron to contain some 95 per cent. of iron, $\frac{57}{0.95} = 60$ pounds of pig metal, so that in order to make 1 ton of

pig iron we should require 1.66 tons of ore. The present price of iron ore (Bessemer) at the blast furnace is $4.50, that of coke $2.50 and even more, but we will assume these figures, and $1 per ton for the limestone. We should remark, however, that for use in the electric furnace the physical state of the carbon is immaterial, since it has to be mixed in small fragments with the ore in coarse powder, consequently pea coal, buckwheat coke, anthracite mines refuse, could be advantageously substituted for lump coal as used in the blast furnace. As a matter of fact, the coal we used in our electric smelting was an anthracite dust, mixed with some small pieces, for which we paid, delivered at the furnace, $1 a ton in the early summer of this year. It contained about 14 per cent. ash and 0.50 per cent. sulphur. Reckoning only on the fixed carbon it contained, the price of carbon for reduction was actually $1.25 per ton. Charcoal, burnt from the smallest limbs or twigs, would be just as suitable in an electric furnace.

We have assumed in the following table of comparison of cost by the two methods the different amounts of horse-power established above for electric smelting from the consideration of the number of thermal units required per pound of pig iron, as claimed by some, calculated or estimated by others, and the practical figure of 200 horse-power, the result of our own practice continued for weeks per ton of pig iron made in 24 hours.

We have made the calculations on the basis of a cost of $10 per electrical horse-power year. We have also assumed 1 ton of coke per ton of pig iron, a rather favorable figure, for the blast furnace.

Cost of Manufacture of 1 *Ton of Pig Iron in Blast Furnace.*

1.66 tons ore at $4.50	$7.47
1 ton coke at $2.50	2.50
Limestone, ½ ton at $1	.50
Labor, incidentals, &c	2.00
(Gross ton) estimated theoretically	$12.47

Cost of Manufacture of 1 *Ton of Pig Iron Electrically.*

	A 125 horse-power.	B 171 horse-power.	C 165 horse-power.	D 186 horse-power.	E 200 horse-power.	F 220 horse-power.
1.66 tons ore at $0.75	$1.25	$1.25	$1.25	$1.25	$1.25	$1.25
Carbon for reduction of 1.33 tons oxide of iron, 0.32 ton at $1.25	.40	.40	.40	.40	.40	.40
Limestone, ½ ton	.50	.50	.50	.50	.50	.50
Labor, &c	2.00	2.00	2.00	2.00	2.00	2.00
Wearing off of electrodes	2.50	2.50	2.50	2.50	2.50	2.50
Horse-power, $10 a year, or $0.0275 a day	3.44	4.70	4.53	5.11	5.50	6.05
	$10.09	$11.35	$11.68	$11.76	$12.15	$12.70
Current, $8 a year	9.40	10.41	10.24	10.74	11.05	11.49

A.—Stassano process, claimed from a run of one hour with 100 horse-power.

B.—Calculated from estimate of units of heat by the writer of the *Engineering News* article, but on a yield of only 85 per cent.

C.—Calculated for the special ore smelted by us in the same manner as in the balance sheet for a blast furnace theoretically.

D.—Practically obtained by us in best runs, 87 per cent. yield.

E.—Same as D; average of all runs, bad, good and indifferent, 80 per cent. yield.

F.—Same as D; worst run observed in our practice.

The Minnie Harvester Company.—The Minnie Harvester Company of St. Paul, Minn., have been incorporated under the laws of Minnesota with a capital stock of $6,000,000. The company are an outgrowth of the harvester business of the American Grass Twine Company of St. Paul, which company retain a controlling interest in the harvester company, but have secured the financial interest of strong Eastern capitalists. The new company will operate the harvester plant at Hazel Park, Minn., where the Minnie line of harvesting machines has been manufactured heretofore. The property consists of 70 acres of ground, and the plant has floor space which will permit an expansion of upward of 100 per cent. in the capacity now exercised. The company will manufacture both types of binders—those for the exclusive use of grass twine and those upon which sisal and manila hemp can be used. The company will be the exclusive distributers of American grass twine. J. O'Shaughnessy, Jr., vice-president of the American Grass Twine Company, announces that it is the policy of the company to sell machines outright to responsible dealers. The organization of the company will be completed by the election of officers soon.

Juniata Shops of the Pennsylvania Railroad.

The Pennsylvania Railroad Company are rebuilding and enlarging their Juniata shops at Altoona, Pa., and work is being pushed as fast as possible. A stone culvert is being built over Hagerty's run for a distance of 170 feet. When completed the level ground thus gained will be the site for the new blacksmith shop, which will be 80 x 210½ feet in size. The new shop will still further increase the capacity of the blacksmithing department of the shops, over and above that of the old shop. This old shop, which was 80 x 306½ feet in size, has had an addition of 80 x 208 feet added and is now 80 x 514½ feet in size.

The boiler shop, originally 80 x 386½ feet, has had an addition of 146 feet put to it, and a still further addition of 176 feet is being added, so that when the changes are completed the boiler shop will be the largest single building at the plant. It will then measure 80 x 722½ feet. The runways for the immense cranes in this shop will be extended 160 feet beyond the end of the building into the metal yard, to facilitate the handling of the materials used in the boiler shop. With the building and the extensions the cranes will have a scope of over 800 feet and will thus make the work in that department much more easy of accomplishment.

The erecting shop, formerly 70 x 354½ feet, is being enlarged by an addition of 224 feet, and will then be 70 x 578½ feet in size. The machine shop, with two floors, originally 75 x 358½ feet, to which an extension of 192 feet had been planned, is having a still further addition of 128 feet, and when completed will be 75 x 578½ feet.

The power house, previously 45 x 83 feet 9 inches in size, is having 22 feet 8 inches added, and when completed will be a building 45 x 106 feet 5 inches, in which will be installed three 350 horse-power cross compound engines built by Wetherill Bros. of Chester, Pa. To each of these engines will be attached a 200-kw. General Electric Company generator, making the total capacity of the plant 600 kw.

When these are installed ready for work all the stationary steam engines in the plant will be removed and everything will be electrically driven. The power plant will be used exclusively for furnishing power, and the electricity for lighting will be drawn from the car shops as at the present time, the alternating current being conveyed to the various departments as needed.

The boiler house, originally 45 x 78 feet 3 inches, will be enlarged so that it will be 45 x 150 feet 10 inches, and from it will come the steam for heating and for the engines of the power plant. The old steel stack, long a familiar landmark, will be torn down, and in its place will rise a Custodos brick stack 150 feet in hight, with a cut stone base. This stack will be similar to the one recently completed for the new boiler house at Fourth street.

The gas producer house, now 17 x 91 feet, will be increased to 17 x 117 feet in size and three new producers added to the plant. Another addition of 38 feet is to be added to the building for the fan house, making its full length 150 feet. In addition to all the other improvements a new storehouse, 45 x 151 feet, is being constructed. The new carpenter and scale shop, now almost completed, is 45 x 162 feet 4 inches.

On November 1, 1901, the Juniata shop payroll contained the names of 1109 men. Last week there were 1400 men on the rolls, and when the present improvements are completed the number of men that will find employment will be close to 2000.

All the new additions will be equipped with the most modern machinery so arranged as to give the company the greatest amount of product at the lowest cost possible and yet maintain the high standard of product for which the shops are noted.

Stahl und Eisen for November gives the production of pig iron in Germany and Luxemburg for September. The product for that month of all kinds of pig iron was 718,702 metric tons, and for the nine months ending with September it was 6,175,235 tons, against 5,871,859 tons in the corresponding period of 1901.

The Microstructure of Iron and Steel.*

BY W. C. POST, CHICAGO.

Before going into the subject of microscopical research of iron and steel, it might be well to acquaint you to some extent with some of the men who have been most prominent in promoting this branch of science. One of the first men we hear from on this subject is Dr. Austin, president of the Iron and Steel Institute of Metallurgy of the Royal College of Science, London, England: A. Martins, director of the Royal Mechanico-technical Station of Charlottenburg, Germany; J. E. Stead, a chemist and metallurgist of Middlesbrough, England; Prof. H. Wedding of Berlin, Germany; Prof. H. M. Howe of Columbia University, New York; Albert Sauveur of the Boston Testing Laboratories. Professor Howe and Mr. Sauveur have both been very prominent

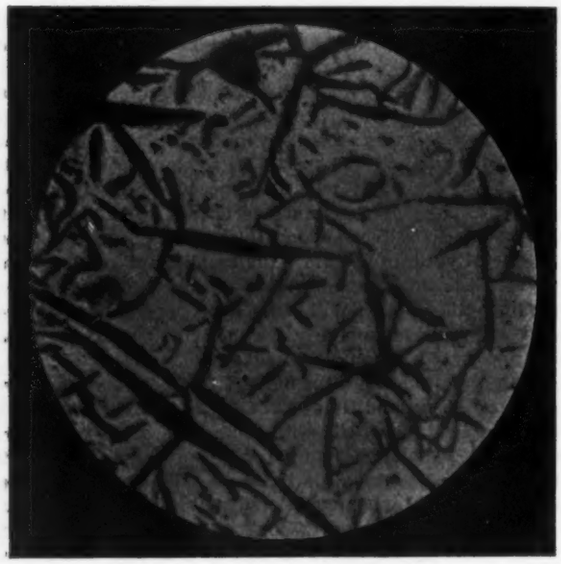


Fig. 1.—Pig Iron.—Magnified 56 Diameters.

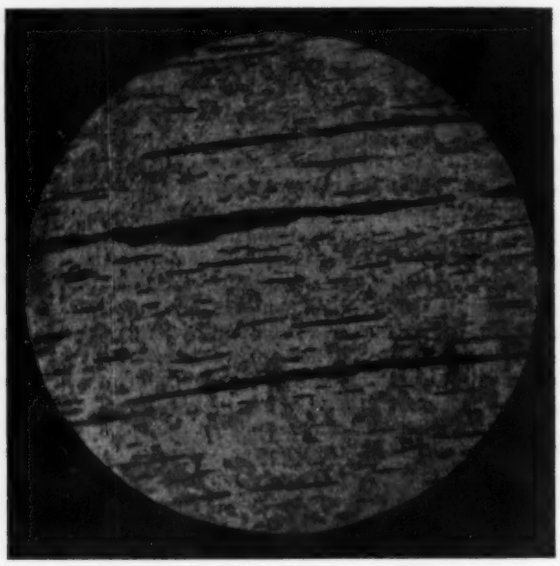


Fig. 2.—Wrought Iron.—Longitudinal Section.—Magnified 56 Diameters.

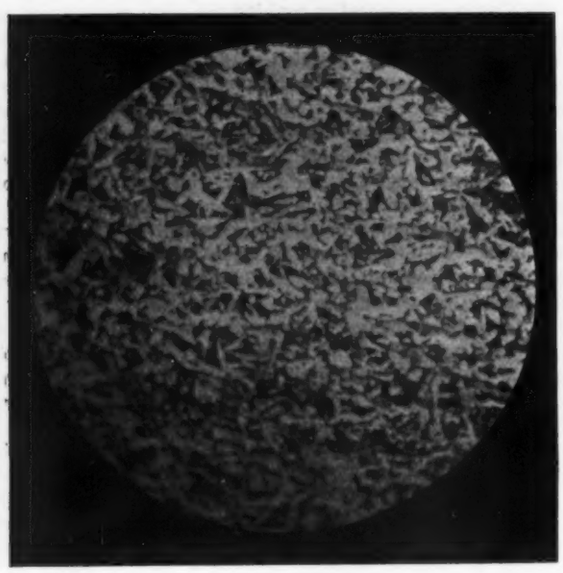


Fig. 3.—Bessemer Rail Steel, Low Carbon.—Magnified 56 Diameters.

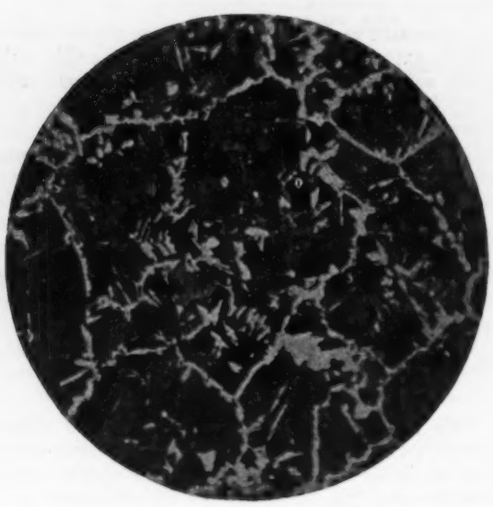


Fig. 4.—Bessemer Rail, Center of Head, Carbon 0.46.—Finished Hot.—Magnified 80 Diameters.

THE MICROSTRUCTURE OF IRON AND STEEL.

Sorby, whose valuable papers thereon date back as far as 1864. At this time they had not the improved apparatus which exists to-day, and his first illustrations were made by water colors instead of photography, as at present. He was one of the first—in fact, I might say the first—to apply the microscope in a practical manner in the examination of metals. Dr. Sorby was followed by a number of other prominent men, such as F. Osmond of Paris, France, who has contributed many valuable papers in this subject; also, W. C. Roberts-

* Address before the National Railroad Master Blacksmiths' Association.

in this work, and Mr. Sauveur edits a book on this subject, which I will speak of later on.

I will first explain the manner in which the specimens are prepared. We first inspect the steel in question and decide upon which part of the steel we wish to examine with a microscope. We then cut a piece to a convenient size, the surface of which is prepared in the following manner:

The specimen is first filed and then polished with several grades of emery paper of increasing fineness. The specimen is then polished with flour emery, which is dampened with distilled water and then put on a block

of wood, the block being covered with a piece of cotton cloth. We then use tripoli in the same manner, and afterward polish the specimen with a very fine grade of jeweler's rouge. The rouge is put upon a block, which is covered with chamois skin and dampened with distilled water. We have now arrived at the point where the specimen is ready for examination by the microscope and for a microscopic photograph.

In front of an electric light is placed a train of condensing lenses which condenses the light and throws it into a small aperture on the side of the microscope. Inside of this aperture is a small reflector, which stands at an angle of 45 degrees and throws the light through the lens on the specimen, which is mounted on a mechanical stage in front of the lens. The specimen then reflects its image back through the microscope and the camera box to the ground glass, and when it is properly focussed the ground glass is removed, the plate holder put in and a photograph can then be taken of the specimen.

After the specimen has been polished in the manner which I have mentioned it is then free from any marks or scratches foreign to the microstructure.

Next in order comes the etching of the specimen. A number of different methods are used, some preferring one and some another. Also, it will be found by those who study the microstructure of iron and steel that different steels require different etching. In etching we develop the microstructure. This can be seen after the specimen is polished, but the etching develops the structure so that it is easier to examine. In some cases we have found that etching with very dilute nitric acid has given good results. To etch in this way one would immerse the specimen for a few seconds in the acid solution, then wash it in running water, immerse it in an alcohol bath and dry before an air blast. In the case of using strong nitric acid we immerse the specimen for an instant in the acid, then wash it immdeiately in running water, immerse in an alcohol bath and dry before an air blast, as in the previous case.

Another and exceptionally good method, I think, is etching the specimen by the use of a very dilute solution of iodine. My reason for preferring this method is because the iodine attacks the surface of the specimen much slower than does the acid solution, thereby giving plenty of time to watch the etching and stop it at the proper time.

Fig. 1 shows a section of pig iron, the dark portions of which represent the graphite in the iron.

This next view, Fig. 2, is a section of wrought iron, the dark portions of which are the streaks of slag running through the bar.

The three most prominent constituents revealed by

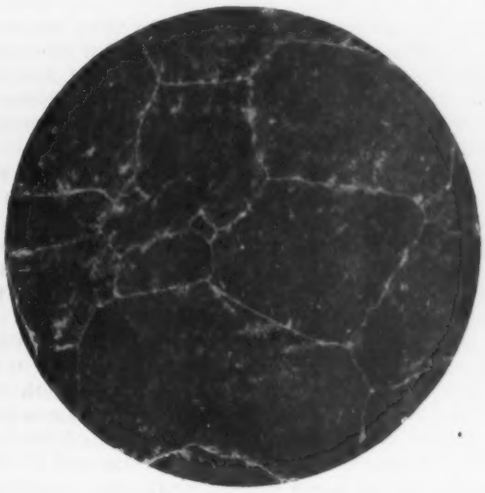


Fig. 5.—Open Hearth Steel, Carbon 0.85.—Heated to High Temperature.—Magnified 80 Diameters.—Average Specimen.

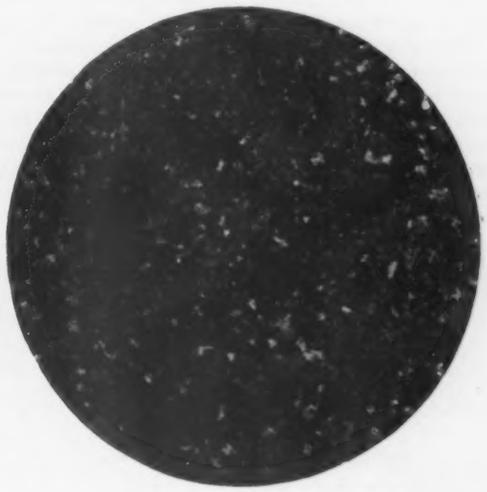


Fig. 6.—Open Hearth Steel, Carbon 0.85.—Proper Heat Treatment.—Magnified 80 Diameters.

Fig. 7.—Open Hearth Steel, Heated to Temperature High Enough to Practically Destroy the Microstructure.—Magnified 80 Diameters.

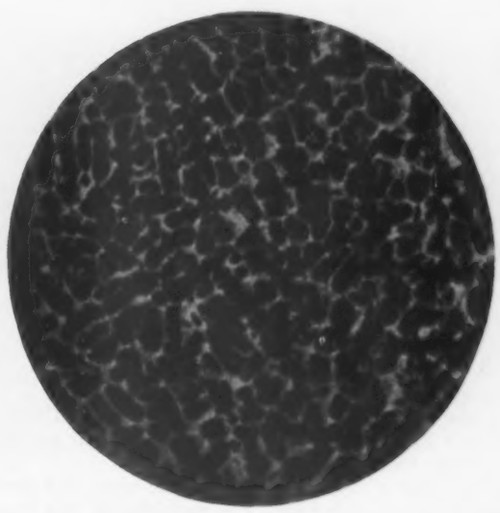


Fig. 8.—Crucible Steel, Annealed.—Carbon 2.62.—Magnified 70 Diameters.

THE MICROSTRUCTURE OF IRON AND STEEL.

the miscroscope are ferrite, cementite and pearlite. Ferrite is an iron free from carbon. Cementite is an iron with some carbon, probably a carbide answering to the formula Fe_3C. It is the hard constituent of steel. Pearlite is combined iron and carbon, and has a dark pearly appearance from which it derives its name. If one were to examine pearlite under a magnification of 300 to 400 diameters he would see that it is made up of a mixture of plates of ferrite and cementite of about the proportion of two-thirds ferrite and one-third cementite. In the case of steels of 0.80 carbon, or under, the ferrite surrounds the large dark portions, which have a pearly appearance; but in the case of higher carbon steels the ferrite seems to be replaced by the cementite. Cementite makes its appearance in this way in steis of about 0.80 carbon and up, and, as Mr. Sauveur has said in one of his papers on this subject, it would seem as if during the slow cooling the ferrite and cementite combine as far as possible, leaving an excess of one or the other. This, of course, is governed by the amount of carbon in the steel and also, to some extent, by the heat treatment which the steel receives.

There are other constituents which have been discov-

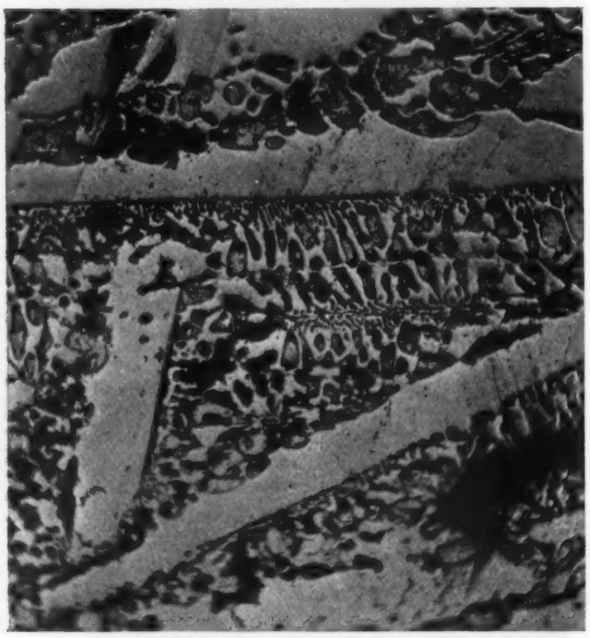


Fig. 9.—Spiegeleisen.—Magnified 80 Diameters.

THE MICROSTRUCTURE OF IRON AND STEEL.

ered by the microscope—*i. e.*, martinsite and austinite—but as they are not commonly met with I will not devote any time to them this evening.

Fig. 3 shows a low carbon Bessemer steel, the dark portions of which represent the pearlite, or the combined iron and carbon, and the light portions the ferrite, or iron that is free from carbon, and one can easily see the excess of free iron in the low carbon steel.

Fig. 4 is a Bessemer steel of 0.46 carbon, and this shows that as the carbon increases the ferrite, or free iron, decreases in proportion.

Before going further I will say that a microscope is used principally in the study of the heat treatment of steels and the tracing of segregation. In the handling of steel in the mills or in the blacksmith shop the heat treatment is one of the most important things; in fact I might say that it is the most important, and in studying this is where the microscope is of the greatest value.

Fig. 4 shows a specimen which was taken from the center of the head of a Bessemer rail which was finished at a high temperature, and the high temperature at which this rail was finished will account for the very large crystals.

This next specimen was taken from a rail that was rolled from the same ingot as specimen No. 5. In a rail finished at a much lower temperature the crystals are much smaller.

We have found in a great many experiments that we have carried on with different grades of steel that the heat treatment affects very materially the size of the crystals, and the size of the crystals influences the strength of the steel. That is to say, in almost every case that has come to my notice I have found that the steel finished at a low temperature, producing a small, well defined microstructure, will give a much better tensile strength.

In studying the size of these crystals Mr. Sauveur has applied a very simple method by the use of the planimeter, with which he traces the outline of all the full sized crystals in the photograph. By tracing the outline of the crystals with this instrument he obtains the total number of square millimeters in the area measured. This sum is then divided by the total number of crystals, the result produced being the average size of a crystal. You can readily see the ease with which comparison can be made, showing various sizes of crystals produced by different temperatures in different grades of steel.

We have also made tests, taking two bars of steel from the same ingot, one of greater diameter than the other, and forging them down to the same size. The larger bar would show a smaller microstructure than the piece forged down from the smaller size. After this operation the two bars were then heated to a like temperature and allowed to cool slowly. After this was done the bars in question were examined by the microscope, and it was found that the crystals in the microstructure were practically the same size in both bars. This would tend to show that the size of the crystals does not depend entirely upon the amount of work put upon it, and also shows what an important part the heat treatment of steel plays in forming the size of the crystals, which, as I have stated before, materially affects the strength of the steel.

Fig. 5 shows the structure of a piece of 0.85 carbon steel which has been heated to a very high temperature. It shows the average structure of the specimen.

Fig. 6 shows one of the many spots wherein the crystals were abnormally large. This piece of steel would stand hardly any tensile strain.

The next photo, Fig. 7, shows the same grade of steel, oil tempered and annealed.

Referring back to Fig. 2 you will see, as I stated before, the black lines of slag running through the iron, and that there is practically no microstructure there which might act as an aid in determining the proper heat treatment, if the occasion presented itself; while in these other cases you can see, as I think I have very clearly shown, that the heat treatment affects the size of the crystals. And let me say again, the size of the crystals affects very materially the strength of the steel, and the point I wish to make most prominent to you, as it appears to me, is that it certainly seems that steel is the proper material to use in all kinds of smithing work, and the only thing necessary is for the smith to acquaint himself with the different grades of steel so as to use the proper material to get good results.

As I have previously stated, we have found that in steels below 0.80 to 0.85 carbon the ferrite, or free iron, appears in excess, surrounding the large dark crystals, and about 0.80 carbon the cementite appears in excess.

Fig. 8 is taken from a piece of steel which has a carbon of 2.62, and you will see the white portions, or cementite, seem to stand out around the dark crystals. The cementite being a hard constituent, it seems to project beyond the dark portions, but in the previous cases the ferrite, or the iron free from carbon, being very soft, does not project as does the cementite.

Fig. 9 is a photograph of spiegeleisen, which does not bear upon the subject I have been talking about, but I simply brought it along to show you, as it is an exceptional microphotograph.

Quite a number present have asked me what book on this subject I would advise them to subscribe for. In answer to this question I will say that I cannot speak too highly of the quarterly journal edited by Mr. Sauveur of the Boston Testing Laboratories, 446 Tremont street, Boston, Mass., called the *Metallographist*. In this book he publishes all the papers and discussions on this subject written by the most prominent metallurgists.

Central Pennsylvania News.

HARRISBURG, PA., November 15, 1902.—At the works of the Pennsylvania Steel Company, in Steelton, after a suspension of most of the departments at intervals covering more than two weeks, the mills are again in operation. The coal situation has improved, but there is very little fuel in reserve, and no assurance is offered that the supply will not again run short. Ten of the largest girders ever made by the company were turned out this week by the bridge and construction department for the Fish River Railroad Bridge. Each is 89 feet 9 inches long, and each weighs 22 tons. Work has been commenced on the structural iron for the new foot and driving bridge across the Susquehanna River at Harrisburg. The company are rapidly putting into operation the extensions of their mills in the vicinity of Highspire. The heads of departments, clerks and draftsmen of the new frog, switch and signal department, lately put in operation, are being served daily with free lunch at the mills, the officials deeming this more profitable to the company than to have their men go several miles home at noon.

The Harrisburg rolling mills closed down Thursday, and will not resume operations until next week. Needed repairs and scarcity of coal are the given reasons.

The Harrisburg Foundry & Machine Works laid off a portion of their force of clerks this week. This was not on account of a dearth of business, for a number of good orders have lately been received. Among the orders filled during the week was that of the People's Light & Power Company of Easton for one 100 horse-power engine and one 900 horse-power engine. The foundry company have received also the contract for the complete steam equipment of the Easton plant, and are now engaged in turning out another 900 horse-power engine for it.

The largest order for the week received by the Central Iron & Steel Company was that for track water troughs, to be used by the Pennsylvania Railroad Company for engine feeding purposes.

As the result of an explosion of the boiler of a furnace in the puddling mill of the West works of the American Iron & Steel Mfg. Company, in Lebanon, on Thursday, eight men are dead, and the company sustained a heavy loss. Nine puddle furnaces adjoining were completely wrecked. One half of the boiler was blown to the rear of the mill, while the other half soared through the roof of the building and was found in a distant field. No cause for the explosion has been given.

After many vicissitudes the works of the Eastern Steel Company, at Pottsville, are at last in operation. The mills, which have been idle for about a half dozen years, have been remodeled and modernized by the new company. The first heat, about 60 tons, was turned out on Tuesday. Most of the first week's product will be used for construction work about the local plant, although a few small orders from Philadelphia will be filled. Large orders are in prospect. John McFadden has been appointed superintendent of the Pottsville plant.

The S. Morgan Smith Company of York, on account of an increase of orders, have broken ground for the erection of a large brick addition to their foundry building, 100 feet in length. Early next spring the firm will erect a large four-story building adjoining the foundry, to be used as a pattern making department. On account of a great rush of business the mills are being run day and night.

The activity of the Baldwin Locomotive Works is being extended to the plant of that company at Burnham. On account of the plants having reached their capacity the Baldwin Company have been compelled to refuse the order of the Canadian Pacific Railroad Company for 12 ten-wheel engines, and the order went to a Scotland firm. The works at Burnham are being enlarged to meet the demands of the company.

The Empire Iron & Steel Company are now filling their furnaces and their plant in Reading will resume operations Monday. The Topton stack, as well as others owned by the company, will be put in blast as soon as possible.

The York Corrugating Company have begun the manufacture of metal cornice work at Eberton, York County. The officers of the new company are P. C. Weist, president; William F. Weist, manager, and A. E. Rice, secretary and treasurer.

General Manager J. P. Luce, for the Lalance & Grosjean Mfg. Company of New York, manufacturers of tin plate and steel, with plants at this place, has purchased a tract of 8½ acres of land west of this city, adjoining the land occupied by the mills. The land will eventually be used for the enlargement of the plant at this point, and it may be a year or more before new buildings are built. The local management advises against the beginning of more improvements until those now under way are completed. S.

The Penman Steel & Iron Works.

The Penman Steel & Iron Works, Beaumont, Texas, incorporated under the laws of Texas last February, are very busy building steel oil, water and grain storage tanks, oil tank cars, stand pipes and steel oil tank barges, and do general steel structural work. The president and general manager is William H. Penman; vice-president and assistant general manager, H. T. Straite; secretary, Hon. R. C. Duff, and treasurer, J. H. Keith.

The company own 35 acres of land, their works now consisting of five buildings. The main building is 100 x 300 feet; car construction shop, 100 x 150 feet; warehouse, 100 x 150 feet; car sheds, 20 x 300 feet, and power house and air plant, 60 x 100 feet. Additions being made are a complete boiler shop, 200 x 300 feet, machine shop and foundry, and a wood working shop. The company have a private railroad on the grounds of 12,000 feet, which will shortly be lengthened 4000 feet, and also a 3000-foot frontage on the Neches River, on which they are about to erect their own wharf and docks.

Since commencing they have undertaken over $1,000,000 worth of business, and have already completed contracts amounting to more than half of this. Among finished contracts are the equipment of oil storage tanks, for the Southern Pacific system from San Antonio, Texas, to San Francisco, Cal.; the whole Santa Fé system in Texas; the Galveston H. & H. Railway system and the International Great Northern Railway. They have constructed 9,000,000 barrels of steel storage for the Higgins Oil & Fuel Company, Beaumont, and the Lone Star & Crescent Company, New Orleans and Beaumont. They have built a refinery for the Union Oil & Refining Company, Beaumont, and also filled a number of similar smaller contracts. They have a tank car department for handling all tank car repairs, and have recently done work of this class for the Waters, Pierce Oil Company and for the Union Tank Line. The company are about to establish sales agencies in Houston and Dallas, Texas; New Orleans, La.; San Francisco, Cal., and the City of Mexico and Tampico, Mexico.

W. R. Mason, Western Union Building, Chicago, who is the Western manager for Coe, Smith & Co., selling agents for the Mechanical Boiler Cleaner Company, is placing on the market in that section the Garrigus mechanical boiler cleaner, which is a mechanical device to prevent the formation of scale, foaming, and the cutting of the packing of cylinders, valve seats and stems. It is designed to remove all foreign matter before it has an opportunity of settling. The solid impurities in water separate under ordinary working pressures and are held in suspension. This foreign matter is carried by the currents to the surface of the water and then to the rear of the boiler, where it is arrested by trough shaped wings; when the junction of the wings is reached the sediment is taken up by a floating skimmer (the mouth of which is always at the scum line) and discharged through an outlet pipe, with a centrifugal force, into the precipitator. The lower temperature in the precipitator and its special construction causes the sediment to settle rapidly. It then remains in the lower compartment of precipitator until drawn off through the blow off pipe. The circulation is completed by the return pipe, which is connected with the boiler, and takes only clear water from the precipitator.

Notes from Scotland.

Decline in the Warrant Market.

GLASGOW, October 31, 1902.—*The Iron Age* is responsible for a decline in the iron warrant market here this week. A cabled summary of your report for the week says that "despite the extremely favorable surface conditions which the iron and steel industry presents, many in the trade express the opinion that the crest of the wave has been passed." Ignoring the further remark that "the scarcity of raw materials and fuel dispels the danger of a sudden collapse," some members of "the ring"—as the community of iron dealers on 'Change is called—seemed to think that the bottom of the tub is beginning to come out. So they began selling and Scotch warrants dropped 6 pence, Cleveland 8 pence and Cumberland hematite 4 pence. This suited those dealers who had American orders on hand—and a good many orders have come in quietly since the anthracite coal strike was declared over—and they bought. Even while the market was at its lowest, inquiries came in from your side for 10,000 tons of Cleveland iron for shipment over the next three months. A few days ago a lot of 5000 tons Cumberland hematite was sold for immediate shipment to the United States, and a steamer was promptly chartered to get away by the end of October. In that case freight could not very well be tested, but within the last day or two steamers have been chartered at 7 shillings from the Tees to the United States, as compared with 10 shillings a fortnight or so ago. Now that the coal strike is over iron freights will be easier, but certainly at 7 shillings there can be no margin outward and there is little prospect of margin on homeward freight.

At the time of writing Scotch warrants are 57 shillings 6 pence, Cleveland 51 shillings 6 pence and Cumberland hematite 60 shillings 9 pence. For East Coast or Middlesbrough hematite makers ask 56 shillings 9 pence, and for Scotch hematite the price is 62 shillings 6 pence, in each case delivered to the steel works in the district. Previous to the drop in the warrant market above noted the "bears" were rather in a quandary, as the "bulls" had complete control, but now there is more ease in the speculative situation. But as regards the stocks of iron as represented by actual warrants, these are really nearly all in one hand and are drawn upon as occasion arises to make up cargoes for shipment. The shipments from the Tees, however, have not been so large this month as last, although the totals are not yet made up. The shipments from Scotland are now about 80,000 tons ahead of last year, and there are now two more furnaces in blast than a year ago. There are, in round numbers, 30,000 tons in the Glasgow warrant stores, 128,000 tons in Middlesbrough and 29,000 tons in Cumberland. Makers in all the districts are supposed to have nothing on hand beyond current needs. But here and in the Northeast of England foundry iron and steel are dull, but trade is better here than in the North of England and quotations are not altered. Indeed, it is difficult to see how makers of iron and steel can afford to take less money, when pig iron is so high and coal is dearer than it was.

The Coal Situation.

As far as coal is concerned, the greater part of the addition to price caused by the sudden American demand has passed off. But here in Scotland about 6 pence per ton remains added to September prices, and the announcement has just been made that coal owners intend to ask an advance of another shilling in November, both for house coal and for special qualities of splint coal used in the iron works. This is a bad move in the circumstances, but the Scotch coal owners do not trouble themselves much about the industrial situation when they think a higher figure can be extracted from consumers. The effect of the rise caused by the American rush, or rather ascribed to the American rush for coal, is that the miners have demanded an advance of 12½ per cent. in wages. This demand came before the Coal Trade Conciliation Board yesterday, but an arrangement was come to and the meeting was adjourned. If the market falls the demand will be rejected and will probably lapse. If the market keeps as it is or advances there will probably be the usual flummery of calling in a neutral chairman to decide between the parties. Meanwhile the shipments of Scotch coal keep largely in excess of last year, notwithstanding the general dullness. The French strike is causing a good many orders to be sent to Scotland, but Scotch coal is now relatively dear as compared with Newcastle coal, and it is probable the export orders will fall off.

Shipbuilding Conditions.

The home consumption will certainly decline as shipbuilding declines here, as it has done and is doing in the North of England. But shipbuilders on the Clyde are still actively employed and do not propose at present to discuss the question of wages, which their *confrères* in England have been discussing and have only partly settled. In October the output of the Scotch shipyards has been 27 vessels aggregating 49,629 tons. These figures compare with 33 vessels and 57,862 tons in September last and with 27 vessels and 48,000 tons in October, 1901. The Clyde proportion of the October output was 44,160 tons, that of Aberdeen 1600 tons and that of Dundee about 4000 tons. For the ten months ending October the Clyde output has been 406,449 tons, that of the Forth 10,973 tons, that of Aberdeen 17,790 tons and that of Dundee 11,057 tons, making for all Scotland a total of 446,269 tons. This ten months' record compares with 443,565 tons in 1901, 398,182 tons in 1900 and 403,396 tons in 1899. The Clyde proportion for ten months was, however, slightly exceeded last year, when 413,724 tons was the total. Among the products of October there were a 6800-ton steamer for the Australian United Steam Navigation Company, a 5900-ton steamer for the Asiatic Steam Navigation Company, a 5300-ton cargo steamer for Liverpool owners, a 4000-ton liner for the British India Steam Navigation Company, a 4700-ton boat for the Mogul Steamship Company's fleet, a 2800-ton boat for the West India service, a 1600-ton boat for the Netherlands Steamship Company and a number of cargo boats of 4000 tons and downward for various British owners, the results of orders given when the outlook of the shipping trade was not so bad as it has become. To sum up, there were put into the water in October one vessel over 6000 tons, two vessels between 5000 and 6000 tons each, three between 4000 and 5000 tons, two between 3000 and 4000 tons, two between 2000 and 3000 tons, three between 1000 and 2000 tons, and the rest under 1000 tons each. Two of the steamers were twin screws, and the total output included a sailing vessel of 2000 tons, a steam turbine yacht, four steam fishing vessels, one dredger, four barges and one tug. Of the total, 1600 tons were for Holland, 1000 tons for Canada and 170 tons for unnamed foreign owners, while all the rest was made for British owners.

Against this output in October the Scotch shipbuilders booked orders during the month to the extent of 52,000 tons. This is considerably in excess of the new contracts for several previous months, but it does not indicate any improvement in shipping. In brief, the October contracts are made up of a Government "Scout" to be built by the Fairfield Company: two large P. & B steamers, to be built by Caird & Co.; two boats of 6000 tons each and one of 2000 tons to be built for the Union Castle Company by Barclay, Curley & Co.; a cable laying steamer to be built by Napier & Miller; a British India liner to be built at Campbeltons, and so on. In short, the October contracts are all Admiralty and "liner" work, which must be kept up, however the freight markets may go. But these orders will, of course, keep the Scotch shipyards well employed for a while, although I hear of several yards, even here, where men are being paid off.

New Combinations.

In a former letter I announced a projected combine between John Brown & Co., Limited, shipbuilders and steel manufacturers, Glasgow and Sheffield, and Thomas Firth & Sons, Limited, steel manufacturers and makers of ordnance, &c., Sheffield. The statement I see was denied by some writers. But "they don't know everything down in Judee." The combination was actually concluded this week, and the directors of John Brown & Co. have issued a circular to their shareholders on the

subject. That company acquire seven-eighths of the ordinary capital of Thomas Firth & Sons (sai to be £300,000), and give in exchange to the Firth Company 90,000 ordinary £1 shares and 21,000 preference £10 shares in the Brown Company, all fully paid. The profits of the Firth Company are said to justify this exchange as an investment, while the amalgamation will permit of considerable extensions and improvements in the works of both companies, which adjoin each other at Sheffield. The amalgamation will also make the Brown-Firth concern a fully equipped arsenal, able to turn out a completely armed war ship constructed and armed with material all made by the company. It will be a strong organization and the third of the kind in Great Britain.

Another notable combine has also been effected here this week. It is one between A. & J. Stewart & Menzies, Limited, steel and steel tube manufacturers, Glasgow, and Lloyd & Lloyd, Limited, tube manufacturers, Birmingham. These are the two largest tube makers in Europe. The Stewart & Menzies concern was formed 12 years ago by an amalgamation between A. & J. Stewart, the Clydesdale Tube Company and Stewart Bros., all tube manufacturers, followed four years ago by combination with John Menzies & Co., makers of seamless or solid drawn tubes and other specialties. The Stewart & Menzies Company have some eight different works of the most efficient and modernly equipped character, in which employment is given some 6000 men. Their capital is about £1,000,000. The Lloyd & Lloyd Company, at Birmingham, have been long established, and have for chairman the present Lord Mayor of Birmingham. They are a family concern, with a capital said to be about £600,000. They have also a controlling interest in some new tube works recently erected in Scotland near one of the Stewart & Menzies factories. The new combine will be the largest tube concern in Europe, and will turn out a greater variety of material than probably any other concern of the kind in the world. B. T.

Poor's Railroad Statistics.

The advance sheets of the introduction to *Poor's Manual* for 1902 contain a number of very interesting statistics of the railroads of the United States for the year ending December 31, 1901.

The length of railroads completed on that date was 198,787.30 miles, and the net increase of mileage in the year was 4453.71.

The operations of the roads reporting full statistics for the year, less than 4000 miles not reporting, show the 600,485,790 passengers were carried, and 1,084,066,451 tons of freights were moved, making 148,959,303,492 tons of freights moved 1 mile.

The gross earnings from traffic were $1,612,448,826; operating expenses, $1,092,154,099; net earnings, $520,294,727, which with other receipts amounting to $68,368,814, give a total available revenue of $588,663,541.

The payments from available revenue, including interest on bonds, $215,191,176; other interest, $7,327,334; dividends, $132,162,935; rentals, $86,438,505; miscellaneous, $36,235,397, show a surplus of $111,308,194 over fixed charges and miscellaneous payments.

There were 195,886.90 miles of road at the close of the fiscal years covered by the reports made, which with 70,105.45 miles of second track, sidings, &c., make a total trackage of 265,992.35. Of this there were 246,811.60 miles of steel rails and 19,180.75 miles of iron rails.

The equipment included 39,729 locomotives and 1,445,283 cars, of which 27,144 were passenger, 8667 baggage, mail, &c., and 1,409,472 freight.

Liabilities were: Capital stock, $5,978,796,249; bonded debt, $6,035,469,741; unfunded debt, $312,225,536; current accounts, $456,798,012; sinking and other funds, $143,670,983; total, $12,926,960,521.

Assets were: Cost of railroad and equipment, $10,717,752,155; other investments, $1,976,548,412; sundry assets, $390,112,441; current accounts, $223,616,024; total, $13,308,029,032. Excess of assets over liabilities was $381,068,511.

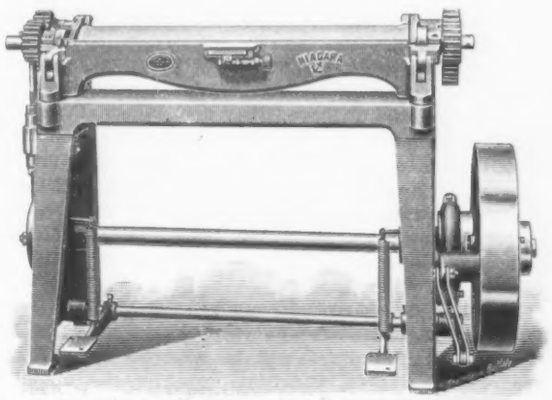
In ten years the following changes occurred in interest, dividends and earnings:

	Average interest.	Average dividends.	Average rate ton mile.	Average passenger rate per mile.	Gross earnings per mile.	Net earnings per mile.
	Per cent.	Per cent.	Cent.	Cents.	$	$
1891.....	4.41	1.87	0.929	2.184	6,851	2,135
1901.....	4.21	2.62	0.743	2.028	8,270	2,668

In 1890 65 systems owned 70,574 miles of road, and in 1900 60 systems owned 94,128 miles of road.

The Niagara Power Bar Folder.

The new bar folder built by the Niagara Machine & Tool Works of Buffalo, N. Y., is power driven, so that the operator is left with both hands free to handle the work. The machine is provided with an adjustable gauge for locks of various widths, with a dial to indicate the width of the lock, with adjustment for rounded locks and an automatic clamp. Both ends of the folding bar are moved by means of segments and pinions from a rocking shaft, which is actuated by a crank. The motion is controlled by a positive clutch which causes the folding bar to make one turn and then stop ready for the next sheet. If the operator keeps the treadle depressed the motion will be continuous. Adjustment can be made to regulate the angle to which the edge is bent. This folder is made in various lengths for iron 24-gauge and lighter.



THE NIAGARA POWER BAR FOLDER.

The Proportiograph.

The Proportiograph is being introduced by the Lawson Mfg. Company, 115 Lake street, Chicago. As the name implies, the Proportiograph is an instrument constructed for accurate, practical work, graduated so that any object on a plane surface may be increased or decreased in size by arithmetical progression to any scale, size or proportion. The instrument is made of steel and is nickel plated. The Proportiograph was originally designed for sheet metal workers, but it has been largely adopted by architects, artists and others. In tin and sheet metal shops, elbow patterns, tee patterns or Y patterns, in sheet metal piping of any style, shape or size, can be drawn from 1 inch up to 30 inches with the regular sized machine. With the Proportiograph and guides these patterns may be constructed with equal ease and accuracy with either the seams in the neck and throat or with the seams on the sides. A set of metal guides are furnished with each instrument, with the seams on the sides, or neck and throat, as preferred. With each guide and the machine 39 diameters can be made, making, with one set of guides, over 1000 patterns of different shapes, styles and sizes. This instrument is also very useful in cornice work and ornamental sheet metal work of every description. For example, it is often very much easier and convenient to draw or lay out a piece of work on a reduced scale. With the Pro-

portiograph the pattern or drawing, on a reduced scale, may be enlarged to full size, or any other size, either larger or smaller, may be made from the original patterns in absolutely correct proportions.

The Brown Corliss Engine Works.

The Brown Corliss Engine Company, Corliss, Wis., incorporated about a year ago, have experienced so much difficulty in obtaining castings promptly that they are pushing the construction of their new foundry, located parallel to the machine shop. The foundry, which will be of brick and steel construction, when completed will be 350 feet long by 116 feet wide. The foundations were completed several weeks since and the steel work is now being erected. The work has progressed so rapidly that the company feel confident of being able to run the first heat within 60 days.

The present machine shop, the building of which was begun last March, is of brick and steel construction, 440 feet 9 inches long and 118 feet 6 inches wide. Under the same roof are the power house and forging room. The gallery of the machine shop, on the west side of the building, is 50 feet wide, 400 feet long, and is equipped with small tools. Two 30-ton traveling cranes run throughout the length of the building, with 36 feet under the hooks, the rail being 40 feet above the floor. Each crane has a speed of 500 feet on the bridge and is equipped with auxiliary hoists.

In planning the construction of the works special attention has been given to the best arrangement for securing economy of both time and labor. Provision also has been made for obtaining an abundance of light. Nearly the entire eastern side of the machine shop, as far as is consistent with strength, is filled with windows from foundation to roof, and on the western side dormer windows, placed above the gallery roof, contribute an additional supply of light, so essential in works of this character.

The space between the foundry and machine shop will be utilized as a storage yard, and connection between the two buildings will be afforded by a 25-ton crane. Castings from the foundry enter the machine shop at the north end, passing over the scales on entering the building.

In equipping the plant the tools of a kind have been grouped together—a group of planers, a group of boring mills and a group of lathes—all placed crosswise to the length of the shop, group following group in natural sequence, the casting being continually moved forward in one direction until the finished material is erected, the traveling cranes having full command of the entire shop at all times, there being no railroad track in the center of the shop, which it is necessary to keep clear. A track, however, runs from the Chicago, Milwaukee & St. Paul road into the plant, being depressed on entering the building at the southern end at right angles to the length of the building, where all material can be easily loaded for shipment.

Reliance for power is placed upon a 500 horse-power Corliss engine, but there are few belts, as most of the important tools are equipped with individual electric multiple motors. Each motor being divided into six different divisions of six volts, is capable of 36 different speeds. Nearly all of the major tools which have been installed have some modifications from the standard type, peculiarly adapting them for individual work. Among the most important deserving mention are a 500-ton hydraulic press and a pit lathe which has been specially built for the company from designs furnished by General Manager Brown. This lathe has a 42-inch spindle, is worm driven and is provided with two heads, so that four tools can work simultaneously. The motor furnishing power is placed underneath the lathe. The prominent features of this tool, by which many hours of labor are saved, will be dwelt upon at another time.

The entire plant is lighted by electricity and heated by the Sturtevant system. With the present shop fully equipped a capacity for turning out annually engines valued at $1,000,000 will be secured, based upon present market prices. The company already have about $400,000 worth of work going through the shop, and with outstanding figures for over $500,000. Within a short time mining machinery, rolling mill work, compressors, &c., as well as engines, will be manufactured.

The Hill Ore Properties.

DULUTH, MINN., November 15, 1902.—The story printed in New York a few days ago to the effect that James J. Hill has been making recent enormous purchases on the Mesaba, &c., is true in a measure. That he has been so doing has been referred to time and again in this correspondence in the past two years, and has formed the basis of more than one special article in *The Iron Age*. I have pointed out that he began these purchases in a small way when he secured the Wright & Davis interests on the Western Mesaba, and with them the Duluth & Winnipeg road, giving him a line direct from the range to ore docks at the head of the lake; and I have further shown that his entry into ore ownership did not become sensationally great or active until the formation of the United States Steel Corporation, when he saw that in order to maintain the integrity of his ore carrying road and docks he must have not only a road, but many mines, and that he should buy as many mines and ore carrying tracts as possible. I referred a few weeks ago to the probable extent of these ore holdings, giving it as the consensus of opinion on the range that he owned nearly 30 per cent. of the whole tonnage shown up, as well as vast acreage of lands on which ore might exist, but on which none has as yet been found. So much as to the facts of ore ownership, secured with the view of providing and guaranteeing his range roads a large and long continued traffic in ore at remunerative rates.

As to the further report that his ore possessions would "eventually be turned over to the United States Steel Corporation, thus making the latter as secure in the matter of ore ownership as the Standard Oil Company from the viewpoint of oil," that is another question. I suppose no one is able to say what the future may bring forth, and stranger things have happened than the purchase of these Hill holdings by the Steel Corporation. But if he sells his mines and ore lands he will insist that with them goes his railroad, for his mines were bought because of it, and without them it would be "two streaks of rust and a right of way." But those who are now stating that he is to sell to the Steel Corporation are evidently unaware of the facts in the case. These mines would be of so little value to the Steel Corporation that it is a most unlikely thing that they may ever buy them. Every one of the opened mines on the Hill road, I think without exception, and much of the undeveloped and untested ore land, is owned outright or held under long time leases from Mr. Hill by some one of the many independent mining and steel making corporations working on the Mesaba. This being the case, the Steel Corporation would be unable to secure any of these ores and the mines would be of no value to them. The Corporation are not likely to buy a lot of mines unless with them they can get ore available for their own furnaces. A great share of the ore classed as "Hill" ore is not in the possession of him or of his road, but is owned outright by independent mining and steel making companies, who have for a valuable consideration contracted with the Great Northern to haul their product to Lake Superior. This valuable consideration is in most cases the right to explore for ore under option for lease on lands already owned by Mr. Hill and his companies. In this way he has used his holdings as a leverage to secure the traffic of outside mines, and it has been a most valuable assistance. The Steel Corporation have clearly been unable, from the nature of their business, to do anything of the like, and it may be said in passing that if Mr. Hill and the corporation were working in harmony for the possession of ore he would not be doing this now. A great many circumstances, observable here frequently in the negotiations for properties by Mr. Hill, and at other times, indicate quite clearly that there is no such harmony and ultimate co-operation in prospect between the Hill and Steel Corporation interests as has been claimed in New York. D. E. W.

Shenango Valley Notes.

The boom at Sharon, Pa., continues and shows no sign of abatement. The work on the many new plants of the Sharon Steel Company is being pushed. The skelp, tube, sheet and universal mills are nearing completion and will be ready to start up about the first of the year. The company already have $10,000,000 invested in mills, furnaces, coal and mining properties, and yet it is announced that the enterprise is only in its infancy. The foundry which the company are building at Wheatland, 2 miles south of South Sharon, will be the largest of its kind in Western Pennsylvania. Two new blast furnaces are being erected, and it is stated that the number of names on the pay roll of the company is 5200. When the mills now being built are completed there will be fully 3000 more men employed by the company. David Adams, the treasurer of the Sharon Steel Company, has recovered from the injuries recently sustained by being struck by a street car.

The resumption of the tin mills at New Castle and South Sharon has caused a lively fall business in real estate and general mercantile lines. The bank deposits at both Sharon and New Castle have steadily increased all summer, and the outlook for another good year's business is very bright.

A fifth bank will shortly be started in Sharon. It will be the Merchants' and Farmers' National and will have a capital stock of $150,000, with a 20 per cent. surplus, being $30.000. The additions to the banking capital of the Shenango Valley for the past 18 months aggregate over $1,000,000.

The Leesburg and Wolf Creek branch of the Pennsylvania line has been opened for traffic into the coal fields at North Liberty and Plain Grove, Lawrence County, Pa. It has been an expensive piece of railroad building.

Notwithstanding the denial of the report, it is again in the air that the interests in control of the Shenango Furnace Company will erect a steel mill at Sharpsville, Pa., where they are now erecting two additional modern blast furnaces. On account of the size of their furnaces and excellent shipping facilities at Sharpsville, it would appear likely that the company would eventually erect a steel plant there.

The machinery is being erected at the new power house of the Ellwood City Power Development Company, Ellwood City, Pa. H. W. Hartman of that place, who has had considerable experience with water power plants, is in charge of the installation. It is the expectation of the company to develop about 1500 horsepower at this dam, which will be the first of a series of dams to be erected on the Connoquenessing. The fall of the stream is 92 feet within 1 mile, and a tributary stream has a fall of 200 feet in 8 miles. The dam just completed at Ellwood City is 175 feet between abutments, and has a curvature of 5 feet at the center. It is 40 feet wide at the base and 25 feet high. The stone masonry of the south abutment is 42 feet high and the brick power house is placed upon this abutment. The dam was begun about two years ago. Part of the power is contracted for with the local water company for pumping water into their reservoir, and other plants in town will be customers at an early date.

A Montreal press dispatch dated November 13 states that Mackenzie & Mann, owners of the Canadian Northern and a railroad in Nova Scotia, have just closed with German rail makers for 40,000 tons of rails and fastenings. The Grand Trunk & Canadian Pacific have recently placed large contracts with German makers, the latter ordering some around the Horn to Vancouver.

The models of frogs, switches and switch stands, &c., that were placed on exhibition at the American Street Railway Association Convention at Detroit in October last by the Pennsylvania Steel Company may now be inspected at the Chicago office of the company, 210 Western Union Building. These models are typical of both interurban, city and steam railroad work.

The New England Foundrymen's Association.

The November meeting of the New England Foundrymen's Association was held at Hotel Essex, Boston, on the 12th inst. An executive meeting was held at 4 o'clock p.m., and at 6 o'clock a dinner was served. An address by E. H. Mumford of the Tabor Mfg. Company, Philadelphia, Pa., whose subject was "The Molding Machine in Its Relation to Foundry Labor," was given immediately after dinner. This address will be found in another part of this issue. There was a large attendance at the meeting and considerable business was transacted, part of which were the election to membership of the Taunton Iron Works, Taunton, Mass., and the appointment of a committee to consider the advisability of the association making arrangements to employ a chemist, whose services to the members of the association could be had at a reasonable price. The committee appointed are B. M. Shaw, Fred. F. Stockwell and John Magee.

About 50 members and guests participated in the dinner, seated in small groups, which added greatly to the sociability of the occasion. At the head table were Henry A. Carpenter, president; Fred. F. Stockwell, secretary; B. M. Shaw, vice-president; Arthur W. Walker, president of the American Foundrymen's Association, and the guest of the evening, E. H. Mumford. Mr. Mumford's address was most interesting and was given careful attention. At its conclusion some time was given to discussion of the points mentioned in the paper, and other valuable information was thereby brought out. On motion of B. M. Shaw, the association gave a rising vote of thanks to Mr. Mumford for his address.

The next meeting of the association will be held at Hotel Essex, Boston, December 10, at which James H. L. Coon, an insurance inspector, will speak on "Insurance Inspection; Its Importance to the Manufacturers."

The Harbison-Walker Refractories Company.

At a special meeting of the stockholders of the Harbison-Walker Refractories Company, held in Pittsburgh last week, it was decided to increase the capital stock from $25,350,000 to $27,600,000, the proceeds of the new issue to be devoted to the buying out of several more fire brick concerns. The present output of the different plants of the Harbison-Walker Refractories Company is about 240,000,000 bricks annually and if certain other plants are taken over this output will be increased to about 285,000,000.

The deal for the acquisition of additional properties will not affect the organization of the company, at least during their present fiscal year. The properties to be taken over are some of those which it was planned to absorb when the merger of the Harbison-Walker Company and smaller manufacturers was completed July 1 of this year. The additional properties are located near the present operations of the company.

As the Refractories Company now stand they own and operate 29 plants, of which the Harbison-Walker Company have 14. These plants are those of the Harbison-Walker Company in Pittsburgh, Hay Station and Cambria and Clearfield counties; the Harbison-Walker Company of Kentucky, operating in the industrial district of Ashland, Ky.; Clearfield Fire Brick Company, Clearfield, Pa.; Phillipsburg Fire Brick Company, Phillipsburg, Pa. Basic Brick Company, Johnstown, Pa.; American Fire Brick Company, Clinton County Fire Brick Company and Fredericks, Munro & Co., at Lock Haven, Pa.; Isaac Reese & Sons Company, Manorville, Pa., and the Mallaceton Fire Brick Company, Mallaceton, Pa.

The officers of the company are S. C. Walker of Pittsburgh, president; H. W. Croft of Pittsburgh, first vice-president; F. H. Wigton of Philadelphia, second vice-president; J. B. Cullum of Pittsburgh, third vice-president; George W. Reese of Pittsburgh, fourth vice-president, and Hamilton Stewart of Pittsburgh, secretary and treasurer.

The Meehan Furnace Top.

The furnace of the Girard Iron Company, Girard, Ohio, has been fitted with a new top invented and patented by Patrick Meehan of the Meehan Boiler & Construction Company, Lowellville, Ohio, which has a number of interesting features. Its construction is such that a free expansion and contraction of the masonry shaft is permitted without disturbing the furnace top, and thus the life of the top of the stack is greatly increased, the amount of fine ore carried out by the gases is reduced and damage due to explosions is greatly decreased. Mr. Meehan thus explains the conditions which in his opinion have made an improvement of this kind desirable:

It has heretofore been the practice to place the gas outlet ports to which the downcomer is connected in the upper portion of the side wall of the furnace, and the top was flat and rested upon the top of the masonry shaft. This construction not only weakened the top of the masonry shaft, but as the gases were taken out through the side walls they would carry with them a considerable amount of the fine ores, and the expansion of the masonry shaft was liable to lift off the top of the furnace resting thereupon. Furthermore, any slight excess of pressure in the furnace chamber would also lift the top off the shaft, thereby necessitating frequent repairs, and whenever an explosion occurred the damage to the furnace top was very great, for the reason that the hopper projecting through the top of the furnace did not extend down into the stack sufficiently far to prevent the stack being filled up with stock very close to the top of the stack, so that when an explosion occurred there was no space into which the exploding gases could expand, and as a consequence the top was liable to be blown off or the furnace otherwise damaged.

The Meehan furnace top comprises a globe shaped top and a hopper projecting through it and down into the stack to such a distance that the stock cannot be filled in close up to the top, thereby leaving at all times a considerable space above the stock line, into which the gases can expand upon explosion, the gas ports connected to the downcomers extending through the globe shaped top, so that the masonry wall of the shaft is not weakened and the ports are thus a considerable distance above the lower end of the hopper, greatly reducing the amount of fine ores carried out by the gas. The improvement also comprises a special manner of supporting this globe shaped top on the shell of the stack, so as to permit free expansion of the masonry walls of the stack, and also details in construction of the top of the wall of the shaft which will permit this free expansion and greatly increase the life of said stack.

In the accompanying drawings, Fig. 1 is a vertical section through the top of the furnace, Fig. 2 is a horizontal section through several of the hollow blocks on top of the masonry shaft and Fig. 3 is a vertical sectional detail of a modification of the upper part of the stack.

The shaft of the furnace is constructed as usual, and comprises the masonry shaft, the metallic shell around it and comparatively soft or porous compressible material, such as furnace cinder, placed between the masonry shaft and the outer shell in order to permit radial expansion and contraction of the masonry shaft. The top of the shaft is formed of one or more tiers of hollow blocks. These blocks are formed of cast metal, and will not wear away easily by the ore falling on them from the hopper, nor by the fine ores which are carried up by the gas, which act somewhat as a sand blast and quickly wear away the ordinary brick or masonry top. The blocks of the lowermost tier are substantially rectangular in shape, except that they are formed on an arc to correspond to the circular shape of the stack. The blocks of the upper tier are triangular in vertical cross section, thereby forming an inclined top for the stack. The various blocks in the several tiers are provided with interlocking tongues and grooves, and similar tongues and grooves are formed between the blocks of the several tiers, for the purpose of holding them securely in place, and the blocks are provided with internal transverse webs or braces to strengthen them. The blocks of the upper tier are provided at their upper ends with downwardly projecting lips which take over the upper end of the shell of the stack, whereby the blocks are held in place, but the connection being such that the blocks can ride up and down on the shell, as the masonry shaft expands and contracts.

The top of the furnace springs from the outer wall of the stack, so that an enlarged chamber is formed at the top of the stack. This top comprises the globe shaped metal shell, which is secured to the shell of the stack a short distance below the upper edge of the latter, and is provided with a refractory lining which extends down into the space between the two shells, a slight clearance space being left between the overhanging lips of the blocks and the lining, so that there is no friction between these parts, in order that the stack may expand and contract freely without affecting the top. Extending through the walls of this globe shaped top are the gas ports, to which are connected the downcomers, the ports being provided at their tops with the usual explosion doors. The lower walls of these gas ports are on a line with the inclined face of the top of the stack, so that a straight and free passage of the gases out of the furnace chamber to the downcomers and explosion doors is provided.

Extending through the top of the furnace is the hopper, which is composed of a series of segments, which comprise a quadrant of a circle. These segments form the side walls of the hopper, and they are provided at their lower ends with internal flanges, upon which rests the funnel shaped bottom, this bottom having an opening which is closed by the usual bell and being held from rising under the pressure of the gases by detachable rods. By this construction it is possible to raise the bell and bottom of the hopper out of the furnace by merely removing the rods. The segments are each cored out or cast about suitable pipes, to the upper ends of which water connections are made, so that water will flow in and around, effectually cooling the lower edges

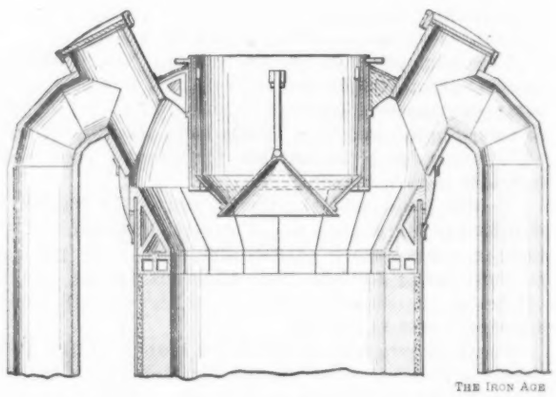


Fig. 1.—Vertical Section through the Top of the Furnace.

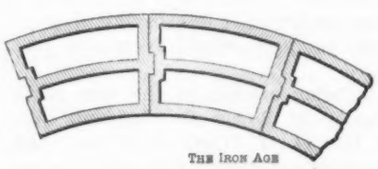


Fig. 2.—The Hollow Blocks.

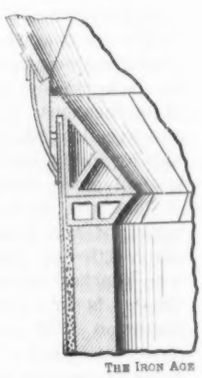


Fig. 3.—Arrangement of Brackets.

THE MEEHAN FURNACE TOP.

of the segments and preventing them from burning out. These segments are also provided with external vertical and horizontal ribs, upon the latter of which rest the lower ends of brackets, bolted to the ribs of the segments and connected to the furnace top and imbedded in refractory material. This construction provides a strong and well braced top for the furnace.

The largest diameter of the globe shaped chamber in the top is above the outlet from the hopper, thereby increasing the space or chamber existing at the top of the furnace. Consequently when an explosion of gases occurs they will expand into this chamber or space, thereby greatly reducing the liability of damaging the top of the furnace. Furthermore, the gas ports are so located in the top as to be in a straight line with the inclined top face of the stack, thus providing a straight path for such expanding gases to the explosion doors, further reducing the liability of damaging the top during explosion. These gas ports are located at a considerable distance above the outlet of the hopper, so that any fine ores which may be carried upward by the gases will have ample opportunity to again settle and return to the furnace chamber before reaching the downcomers. The straight faces of the gas ports and corresponding faces on the top of the stack prevent the lodgment of these fine ores, and thus facilitate their return to the furnace chamber.

Germany Threatens a Tariff War.

A press cablegram from Berlin, Germany, under date of November 13, states that on that day the Reichstag adopted, by 192 to 71 votes, the paragraph of the new tariff bill authorizing the Government to retaliate on any country discriminating against German goods. The Agrarians openly affirmed that it was necessary to arm the Government with weapons for reprisal, especially against the United States customs practices.

Dr. Brumer, National Liberal, cited an instance in which, he said, $200,000 worth of enameled goods were ordered in Germany for New York, but the customs officer "changed the classification at the instance of the American trust, whereupon the New York importer canceled the order." It was proved, the speaker said, to the customs officers that the invoice was in exact accord with the German seller's books, and that instead of the goods being undervalued the books showed that shipments had been made to India at still lower prices. Dr. Brumer further asserted that the customs officers' treatment was dictated by the interests of the home manufacturers, and he continued:

"It is said that we must not offend the United States; but they will respect us more and we shall gain more by showing our teeth than by always giving pleasant words."

Herr Gothein, Radical Liberal, replied that such words were no fitting epilogue to the sentiments expressed by Count Posadowsky, the Home Secretary, in the presence of the Foreign Secretary, Baron von Richthofen, at Ambassador White's farewell dinner. "They will make discord," he continued, "among the wishes spoken there for friendly relations with the United States. Why empower the Government to do something it does not want to do? Although the present Government would not apply the paragraph, some succeeding Government might commit such a folly. Retailiatory duties are the weapons of Chauvinism and not of patriotism."

Herr Fischback, Radical, said all the Chambers of Commerce were opposed to a tariff war with the United States. Herr Broemel, Radical, remarked that if Germany adopted retaliatory measures against the United States on account of regulations which applied to the goods of all countries it would be a serious breach of the existing treaties.

The announcement is authorized that the Ministry has not decided to drop the tariff bill, as the report was published in London, but is determined to persist until the dissolution of the Reichstag in June.

The New York firm referred to above is Stransky & Co., 9 and 11 Murray street, wholesale dealers in enameled goods. A member of the firm, on being interviewed, said:

"Concerning the importation you refer to, the goods were purchased unassorted—that is, just as they run. The Collector of Customs here takes the ground that the goods, which arrived early last July, ought to be advanced to the prices as provided by the German trust. Our contention is that these goods were not to be compared with that trust price-list, for the reason that they are of a different class, being unassorted. The comparison of the two grades of goods is unfair to us. It is a well-known fact, and can be proved by any of the department store buyers in the United States, that enamel ware goods sold by the trust here as the run of the furnace can be bought from 20 to 25 per cent. cheaper than goods which are assorted. We assert that the importation in question should not be advanced to the same rate of duty as assorted goods. The matter is before the Board of General Appraisers here, and we expect a decision soon. If it is adverse to us I do not care to say what course we will adopt. Thus far we have not canceled the order."

White River Power Plant, Washington.

Another immense power plant similar to that at Snoquahine Falls is to be constructed on the White River, a few miles from Tacoma, Wash. The White River Power Company, who originated the scheme, have been absorbed by the Snoquahine Falls Power Company of Seattle, and both plants are to be operated by the Snoquahine Falls & White River Power Company, recently incorporated with a capital stock of $2,000,000.

The general plan for the White River power development will be to divert the water at a point near Buckley and to convey it through an excavated canal a distance of about 8 miles to Lake Tapps, which lies on the brow of the hill above the Stuck River Valley. The level of that lake will be raised until it occupies an area of about 5000 acres, and will serve as a storage reservoir and settling basin. It will have a capacity for supplying 60,000 horse-power for 20 days without any call upon the river. The outlet of the lake will be a short canal and tunnel connecting with a penstock. Steel pipes leading from the penstock will convey the water under a head of 450 feet to the water wheels in the power house at the foot of the hill, and from the water wheels the water will escape through a short tail race into Stuck River. The power house will be connected with the present Snoquahine Falls transmission system by circuits of about 5 miles, and both plants will be run together, each serving as a reserve for the other.

The power house is designed to accommodate a 50,000 horse-power installation of water wheels, generators, &c., but for the present machinery for about 10,000 horse-power only will be installed, including two 3000-kw. generators and two exciters of the Westinghouse type, direct connected to impact water wheels of sufficient capacity to drive the generators under full head. As an adjunct there will be a machine shop equipped with lathe, drill press, shaper and blacksmith forge, with the necessary accessories. The new plant will represent an outlay of about $1,500,000, and is expected to be in operation in about one year. Charles H. Baker, president and chief engineer of the Snoquahine Falls Power Company, will be president of the new company.

The West End Furnace Company.—Roanoke Furnace and the Roanoke Iron Works, Roanoke, Va., which were purchased at auction early in August by Donald Macleod of Philadelphia for $170,000, are to be operated by the West End Furnace Company, who were incorporated the first of the week with a capital stock of $500,000. The furnace is 17 x 82 feet, and has an annual capacity of 48,000 tons. The rolling mill has a capacity of 21,500 tons of muck and scrap bar iron. The officers and directors are: President, H. T. Deckhert of Philadelphia; secretary and treasurer, Donald Macleod of Philadelphia; T. D. Richardson, R. G. Stewart and C. C. Norris of Philadelphia, and J. F. Sener of Lancaster, Pa.

The Holly Mfg. Company have moved their offices from Lockport, N. Y., to Clinton street and Roberts avenue, Buffalo.

Salisbury Steel & Iron Company.

Electric Concentration and Electric Furnace.

The Salisbury Steel & Iron Company filed articles of incorporation with the Secretary of State at Albany, N. Y., on the 12th inst., with an authorized capital of $1,000,000, for the purpose of mining, sale and shipments of iron ore, the erection and operation of blast, open hearth, electric and reduction furnaces, the purchase and sale of property stock of other corporations, the acquiring of water rights for the erection and operation of electric power plants, the construction and operation of railroads, with the necessary equipment for the mining, manufacture and sale of metal products, with the principal business office located at Utica, N. Y. The three years; W. J. Rattle of Cleveland, Ohio, an eminent geologist and experienced mining engineer, originally prospected this property and has located the veins of the ore body for a distance of over 6000 feet on the surface, and it was upon his advice that the veins have been opened at different points to the extent that pits have been sunk to various depths of from 30 to 90 feet, with the result that the ore body increases in width as the pits have increased in depth. Several thousand tons of this ore have been mined and shipped to blast and open hearth furnaces, and is pronounced an exceedingly rich magnetic ore, carrying 62 per cent. metallic iron, being reasonably low in phosphorus and sulphur.

It is the intention of the company to install a modern equipment of mining machinery for extensive operations, to enable ore to be supplied to blast furnace com-

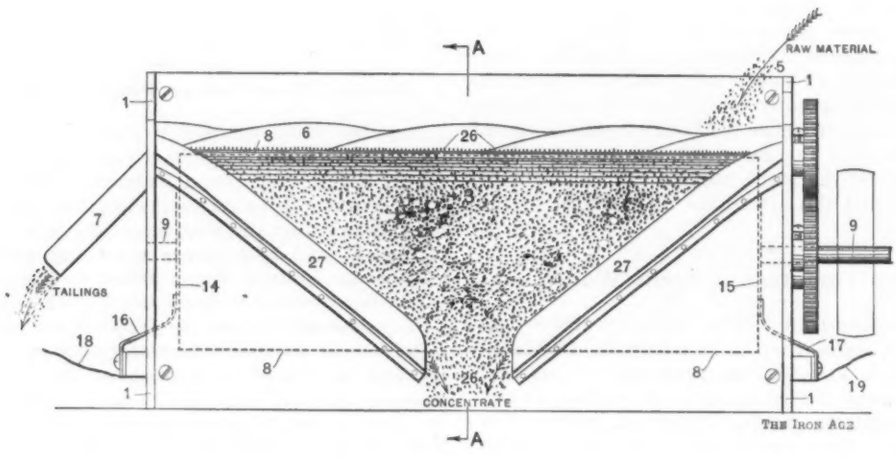


Fig. 1.—Magnetic Separator.

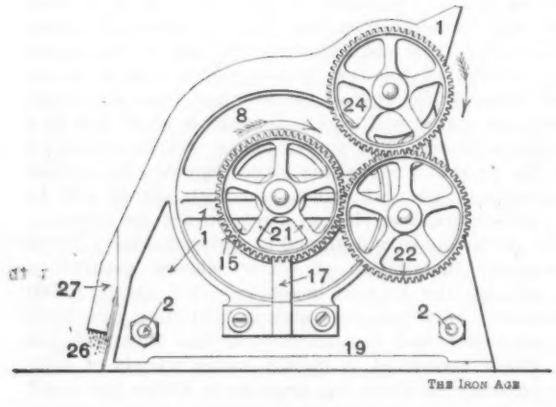


Fig. 2.—Elevation Right Hand End of Fig. 1.

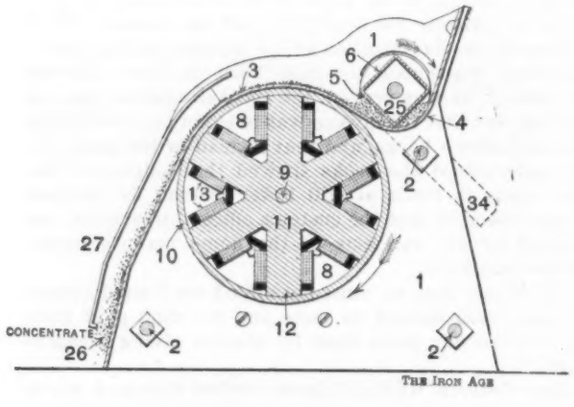


Fig. 3.—Section on Line A A of Fig. 1.

SALISBURY STEEL & IRON COMPANY.

directors for the first year are Geo. M. Bard, Wilmington, Del.; H. L. Elkins, Wm. W. Hearne, Philadelphia, Pa.; Wm. Kerby, New York City; Henry M. Clark, Boston, Mass.; Victor Adams, Little Falls, N. Y., and Wm. H. Switzer of Utica, N. Y. At a subsequent meeting of the directors held in New York the following officers were elected: Geo. M. Bard, president; Victor Adams, vice-president; H. L. Elkins, treasurer; Wm. H. Switzer, secretary. President Bard is well known to the iron trade through his prominent connection with the Republic Iron & Steel Company prior to January 1 of this year.

This company have acquired by purchase 320 acres of iron ore lands located on the western slope of Oak Mountains in the township of Salisbury, Herkimer County, N. Y., 5 miles distant from the terminal of the Dolgeville Railroad and 16 miles northeast from the station at Little Falls, N. Y., on the main line of the New York Central & Hudson River Railroad. Development work has been in progress on this ore body for the past panies, which will be their immediate aim. At the same time negotiations have been consummated for the installation of the Ruthenberg processes (described below) in the separation and concentration of these ores by electricity, whereby magnetic concentrates are produced that assay as follows: Metallic iron, 70 per cent.; silica, 1.44 per cent.; phosphorus, 0.118 per cent.; sulphur, 0.10 per cent.

The company have secured options on valuable water rights, representing several thousand horse-power, contiguous to their property, and it is their intention to utilize this power in the erection of an electric power plant, thereby developing the current necessary for the operating of the Ruthenberg process in the concentration of the ore, as well as for the reduction of these concentrates by the Ruthenberg electric furnace, producing an excellent material for use in the blast furnace, or, by continuous treatment in a heating or soaking pit, an ideal melting stock is produced for the open hearth steel making furnace.

The Pennsylvania Steel Company are installing the Ruthenberg processes at their Lebanon, Pa., plant for the production of magnetic concentrates from the well-known Cornwall ores, and are also erecting a Ruthenberg electric furnace for the reduction of these concentrates for the blast furnace. Mr. Ruthenberg has just completed the erection of an electric furnace at Lockport, N. Y., for the reduction of concentrates that he is transporting from the north shores of the St. Lawrence River, near Quebec, Canada. The concentrates are separated from the beach sands, that abound in magnetic oxides of iron. Negotiations are also pending for the erection of a large electric steel mill under these processes, near San Francisco, Cal., whereby Pacific Coast

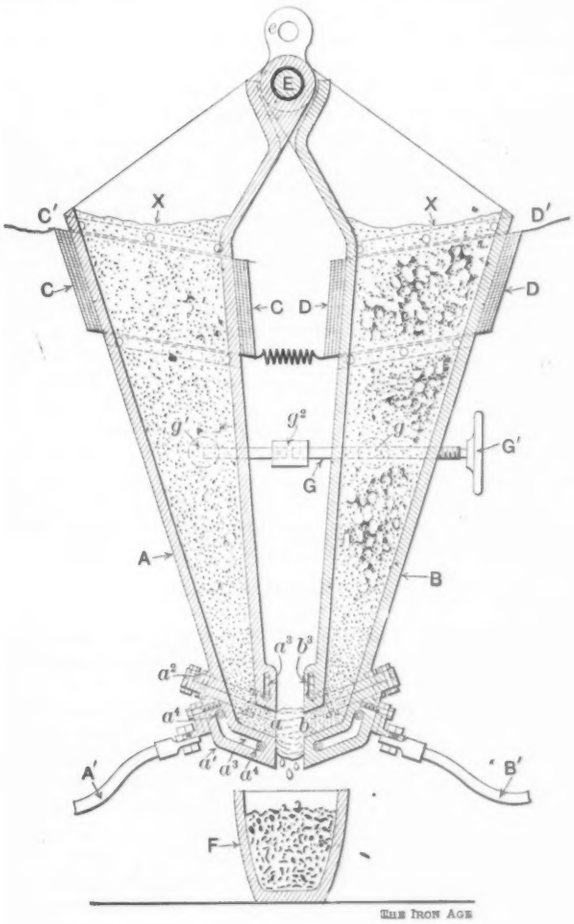


Fig. 4.—Electric Furnace.

SALISBURY STEEL & IRON COMPANY.

concentrates and Northern California iron ores will be used.

Electric Concentration.

The Ruthenberg process for the electric concentration of magnetic iron ores provides a separator, in which the magnetizable portion of the material treated is supported, during its extraction from the gangue, by means independent of the magnet field. One advantage of this improvement is the economy of magnetic force which results from such an independent support of the material treated.

The construction of the device will be understood from the following description of its operation: The magnet 11, being energized, a magnetic field is produced, comprising lines of force which radiate from the outer extremities of the poles 12, and are practically concentric with the axis of the drum 8 at a point midway between the poles. Upon the magnetic field being rotated toward the thin layer of raw material at 5, at the margin of the receptacle 4, the individual particles of ore are induced to approximate to the lines of force. In other words, particle 26 is first caused to stand on end radially with respect to the pole 12 passing beneath it, is then caused to lie down toward the left hand side of Fig. 3, and is by the next succeeding pole caused to rise upon its opposite end and is thus progressed over and over, end for end, up the incline presented by the shell 3, which supports its weight until it gravitates down the shell and is caught by the discharge chutes 27, which are conveniently arranged to deliver the concentrate, as shown in Fig. 1. The nonmagnetizable portions of the raw material are retained in the receptacle 4 by the force of gravity, while the magnetizable particles are uplifted, as just explained, and any fine dust entrained by the latter is threshed out by the rising and falling of the particles before the crest of the shell 3 is reached, so that the separation of the magnetizable material is completely effected by the single operation described. The raw material, being continuously agitated and progressed by means of the feeding mechanism, comprising the screw 6, is deprived of all of its magnetizable constituents before the left hand extremity of the machine shown in Fig. 1 is reached, and the worthless tailings or gangue 28 is discharged by the feed screw down the chute 7.

It is obvious that a selective discharge of the product, in accordance with its magnetic permeability, may be secured by making the magnetic field in longitudinal sections of different force and providing suitable chute partitions 34 upon the shell 3 to separate the product in accordance therewith.

Electric Furnace.

In the Ruthenberg electric furnace, shown in Fig. 4, the material treated is fused within a magnetic field. Referring to the drawing, A B are the opposed electrodes of the fusing circuit, which comprises the conductors A' B'. The electrodes are tubular and adapted to convey the raw material X to and through the orifices *a b*, which are opposed at the lower extremities of the electrodes. The electrodes are of opposite polarity, being magnetized by the coils C D. The electrodes are insulated from each other, and are pivotally supported upon the shaft E. The fusing current is thus compelled to traverse the gap between *a b*, and this gap may be increased or diminished by the adjusting bar G. The opposing ends of this bar are insulated by the collar g^2. In order to protect the terminals A B they are provided with the shoes *a'*, which are removably secured by the bolts a^2. The jacket spaces a^3 receive a current of water.

The ore, being magnetized, becomes a part of the core of the magnets at the fusing region and by the stress of the magnetic field is postively progressed through the electrodes and caused to bridge the gap between the openings *a b*. The effect of this magnetic bridging of the gap is to localize the highest temperature within the mass of material extending across the gap between the electrodes, from which the fused product gravitates in globules or irregular lumps, the rate of discharge of the product being determined by the rate of progression of the raw material to the fusing region between the electrodes.

It is to be noted that in the form shown in Fig. 4 the magnetic field between the opposite poles of the electromagnets forms the sole support for the material at the fusing region. However, in treating some material it is advantageous to provide the orifices *a b* with floors of carbon or other suitable refractory material. Such floors, of course, limit the absorption of heat by the electrodes, and provision is made for their being moved forward as they become eroded.

At the recent Düsseldorf exhibition, Arthur Koppel, 66-68 Broad street, New York, was awarded the silver medal for his exhibit of industrial railway equipment, dump cars, inclined planes, self discharging ore cars, electric railroads, &c. This is stated to be the highest medal given for industrial railway equipment at this exhibition. It will be remembered that the same firm also received the gold and silver medal at the Paris Exhibition, which was the highest award given there for similar material.

The Relation of the Molding Machine to Foundry Labor.*

BY E. H. MUMFORD, PHILADELPHIA.

Human nature is the same in all men. Ambition to make what they have net them the largest returns is the natural aim of both the man who has capital, plant and machines and the man who has only his hands. In the face of these facts, it is sometimes difficult for either side of the great question of the day between what are called "Capital" and "Labor" to see the application of the Golden Rule.

In the sense of common sense, both the man who has resources of machinery and money, acquired whether by thrift or exaction, and the man who has strength and brains only are capitalists, and it is according to the stewardship of each that he grows poorer or richer. Nature's law of the survival of the fittest may be somewhat old fashioned, but it is still invincible to any combination of men against it and incorruptible by any human bribe, whether it be the cheap and easy gift of the rich man or the costly and exhausting intimidation and boycott of the equally powerful trades union. Neither millions of money nor thousands of men may meddle in the slightest with the victory of the strong and vanquishing of the weak, for such is God's law—beneficent like all his works.

Let no one think I call him strong who has money, and him weak who has not. Some of the weakest structures have been the most colossal in financial resources, State privileges and social prestige. Such was the Panama Canal Company, with "money to burn," yet worm eaten and rotted by the fatal weakness of weak men, the love of self and its silly sister, self indulgence. Some of the grandest products of history have been poor men. What corporation was ever one-half so strong as Abraham Lincoln? One of the poorest men who ever lived, what corporation could have abused for its little time the rights of the community while Lincoln wielded the scepter of righteousness over the most beneficent armies the world ever saw? Lincoln will be a cathedral structure when the Standard Oil Company, passing into the management of weak and selfish men, has vanished into dungeon mold. Thus tediously, I have dwelt with the bases of human industry, hoping to show the truth of my belief, that no arbitrary, selfish action of either a corporation or a trades union can ever prevail against the mighty destiny of right—which alone is might.

When I was asked to address you, my topic for this evening naturally became what has been announced, and, even in its first approaches, it as naturally plunges at once into the relation of the molding machine to union foundry labor, since molding machine operatives are at this particular time being adopted by the Iron Molders' Union of North America.

The Introduction of Molding Machines.

When I had my first experiences in starting power molding machines in foundries which had previously used no machines of any sort, or, at most, only hand machines, their introduction was a very simple matter. We have never sold machines subject to a guarantee of output, and it has therefore been a matter of the purchaser's finding out what he could get out of the machine—as often finding that we had, in selling the machine, understated its output as that we had overstated it. Sometimes the foreman of the shop, often the proprietor himself, on a Sunday or holiday, would jump into the work and see what a willing man could do. Then, perhaps, the next day, a laborer, glad of the opportunity to better his position, would take the machine, and gradually increasing his output, would, at the end of a week or two, establish a figure for a fair day's work, or a basis for piece work price.

At this writing, machines that I know of are running under one or the other of these arrangements, none of the refinements of the piece pay system having been, to my knowledge, attempted in a line of work as difficult of standardization as the variety of work which usually finds its way to a molding machine, and which has so many influences affecting its plan.

So simple, seven years ago, was the starting of a molding machine as above, that, generally speaking, the pace first set was at least maintained—and generally increased, and the molders in the shop took a friendly notice of an innovation they felt they had little interest in. Now things have changed. Mr. Fox, the president of the Iron Molders' Union, a man who, in the slight acquaintance I have enjoyed, has impressed me as one of the men I have above classed as strong, for I think he loves fair play and justice, has called upon his men to do as union men have done before—lay hold of the machine. At the same time, he advised that, to use Mr. Fox's own words, the union molder "will never be given that opportunity unless he is *willing to do justice* to the possibilities of the machine and shows a willingness to *conscientiously assist* in its development."

The italics are mine, and I hope Mr. Fox will pardon their intrusion. I wish to emphasize the wisdom of, I believe, one of the wisest leaders trades unionism could ever boast. Unfortunately, not all of Mr. Fox's followers are as wise as he. Therefore, comparatively few molders are to-day running molding machines. But the lack of wisdom among the laymen of the trade is not the only reason for the dearth of molders on machines.

I feel that I occupy a somewhat unique position, in that I have constantly to do with foundry molding, yet am neither a molder nor an employer of molders, and I trust that I may be allowed to speak plainly, and that what I say may be regarded as without bias, as, obviously, it is immaterial to me, as a builder only of molding machines, whether they are operated by molders or just plain men, as long as the purchaser of the machines gets from them the benefit he has a right to expect from the introduction of improved machinery and the molder doesn't interfere with this right, while coupling his own success to that of the machine.

An Interesting Incident.

Since the days of my first experiences, the following incident may be chosen to exemplify what sometimes happens:

One of our machines had stood working rather aimlessly, and I must say ineffectively, in a large union foundry. It had done so poorly and looked so lonely that we were afraid, though it had been paid for, that it might get homesick and try to get back to us. So we suggested that we be allowed to send an old friend of the machine up to bear it company for a while, work with it and generally brace it up. We had picked this man from a lot of molders, not caring very much whether he was a union man or not, for, I repeat, we consider "a man's a man for a' that." Fortunately for the event, he had a card, rather to our surprise, and served us faithfully.

This man had hardly brushed the dust off the machine when a shop committee waited on him and asked his business in that shop. On his stating that he had come to run the machine and instruct the laborer who was running it, he was told that he could not make a mold in that shop unless he had a union card. After demurring on the ground that he was employed by us, and not by the purchaser of the machine, and finding it useless and futile to argue, he showed his card, and was then told that he must not "set a pace" on the machine; in fact, must not in any way interfere with the laborer, who had up to that time succeeded in putting up and pouring 30 flasks in a day.

At this point the matter was referred to the management and it decided, in conference, that our man might run the machine for an hour only in the way of showing the operator how. The result was that, approximately, the previous day's work was molded in an hour, and the laborer, again under the limitation of the "local," ran for months at a speed of about 50 or 55 molds per day. Finally, by good management, making possible the installation of a number of machines, the machines having been set in a kind of separate inclosure, the output of this and other machines on simi-

* Address before the New England Foundrymen's Association, Boston, November 12.

lar work was made about 150 flasks per day, and remained so for years, or approximately so.

Now, the kind of opposition this machine met does credit to the molders in the shop, and it is always so in cases where opposition has been shown. In the hundreds of machine installations that have come under my notice, even where the feeling among the men was, I must say, naturally most intense, I have not known of a single threat of violence—hardly of discourtesy. The matter has always been treated from the business view point of the union, if I may use the term "business" for the point of view of the threatened strike. Often the end of making the machine unpopular has been accomplished by the simple and effective method of social ostracism of a too willing operator. Again I use a term not commonly accepted. But I submit there is a very real society in a large foundry. A man soon learns what is and what is not "good form." Those of us who have worked with workingmen know that what is true of a gentleman's club is equally true of a foundry, so far as being a "good fellow" is concerned, and to persuade a fellow workman to the view of the majority it is not necessary to hit him with a club.

But is the view of the majority in any one foundry, or, for that matter, a community of foundries, always the right view? If it is not, against I say, it is bound to fail when the light of day and of average common sense is turned upon it, for it is weak, and unfit and cannot survive.

It is the unfortunate fact of our time that in the light of such mistaken and ridiculous socialism as is harangued and yellow-journaled into the minds of men who listen to and read such stuff, all innovations, changes of any sort suggested or adopted by an employer of labor, are regarded from the start with at least a doubt of their ingenuousness, and many a strike has been inaugurated in haste and repented at leisure.

There is no monopoly of brains in this world, and a lie, a deceit or an unfair deal is the easiest thing in the world to beat. When a foundry owner purchases a machine, which he demonstrates in the shop by actual working is capable of saving labor or saving time and thus can cheapen cost, while dispensing with a kind of skill formerly necessary for the work it does rapidly and well, is there any one here, is there a man anywhere, without or within a trades union, who will pretend that there is any power on earth which can prevent the ultimate success of that machine? If the machine is capable of doing its work with unskilled labor, does any one suppose its operation by skilled men can be forced? Lastly, what arbitrary limitation of what Mr. Fox has called its "best possibilities," will be tolerated by the community at large, which has experienced the benefits of modern machinery, has doubled its life-span by using the loom, the locomotive and the linotype?

Union Limitation of Machine Economy.

There are two methods by which local unions attempt and often temporarily succeed in limitation of machine economy. The first is by insisting that none but skilled molders should run the machines, with the usual and perfectly natural result that, as the man wants at least as much money for operating the machine as he had before, and doesn't want to work any harder than he did before, the saving effected by the machine is limited to what the molder is willing to concede the machine saves him in actual labor. Now, when a molder who has not been in the habit of using his muscles like an Italian digging a trench, but has for years been doing "first rate," as the foreman would say, putting up and pouring, say, 40 flasks of good work, patterns carefully rapped and drawn, weak corners faithfully swabbed and mended up, these last operations—probably one-half to three-fourths his time—requiring his skill and none of his strength—when this man, who is only half a laborer, is called upon to do what is entirely laborer's work, is it any wonder that he gets tired?

I have seen molders in Tiffany's silver foundry, who, working for days on a single mold, needed no more physical strength than the artist who paints a picture. I would not be surprised to learn that they play golf for exercise. From him to the Hungarian who pounds sand and rolls flasks for 30 to 40 4-foot loops for radiators is a long rank of molders, each fitted and equipped for his work as the Italian in the trench or the banker in his office is fitted for his. All are workers, all labor, each in his own way and according to his capacity. The molder, with the well earned pride in his trade, is not enough of a laboring man to run the average molding machine.

The second method by which the molder is at the moment seeking to, perhaps only incidentally, limit machine output is by adopting into the union under a special classification the laborers already operating machines, with the result of bringing to bear that unfortunate influence incident to loyalty to a common body of men—a rivalry for popularity by keeping the unit of work as low as possible, while keeping the unit of pay as high as may be. This, as I have said, is a natural tendency of a man or of a body of men who have to sell the product of their hands or their heads for as good a price as they can get for it. In the individual, the effect of this disposition to do the best he can for himself varies with the man's capacity for work. It is natural for some men to prefer activity to slowness. Then, too, some men are stronger than others and, in the long run, the active and exceptionally able man rises in output and income above the ranks of his mates. The disposition of a body of men acting in concert is the disposition of the average man, and if we are to adopt mediocrity instead of excellence as a standard, and it is well for the community that we should do so, why not let the principle run into every branch of human effort as well as labor? Picture to yourselves an average world, if such a world were possible—no eminently strong men, no eminently brave men, no eminently intellectual men, no eminently good men—just average, common, mediocre men, without ambition to do or to dare! If it were possible to raise the standard of the weak by lowering that of the strong, there might be compensating benefits, but it is impossible; a weak man cannot exceed his strength, but it is lamentably easy for the strong man to do less than he is able.

The Position of the National Officials.

You can see from my quotations that the president of the Iron Molders' Union does not believe in mediocrity. He cautions his men to be satisfied only with the "best." There is no low standard of efficiency about that and I hope that this earnest man of high standards may recover his health and lead his men in the straight and honorable path he has always chosen and they themselves would always choose if they stopped to think and did not harken too much to the harpies who prey upon their industry while breathing discord, class hatred and bloody riot in the land.

Let me read a part of the letter just received from David Black, the editor of the *Iron Molders' Journal*, who writes for Mr. Fox, he being too ill. He says:

> I am very well aware of the charge that is very generally made against trade unions, not only as their policy applies to molding machines but to work in general. The charge that the union is engaged in attempting to limit output may be the result of ignorance of its purposes, or of a desire to prejudice it in the eyes of the public and of foundrymen generally. It has no existence in actual fact. The union in no sense attempts to limit output arbitrarily. The officers of the Iron Molders' Union in every instance advise their members to bring out the best possibilities of the machine. We realize, of course, that in some cases inborn prejudice induces men to act unreasonably at times when the machine is introduced, but I believe during the past ten years the molders of the country have received an education which has demonstrated to them the folly of such a course, and I am glad to be able to say that this foolish policy is now an exception rather than the rule. We can well look forward to the time when there will not be the same demand for skilled molders that there is to-day, and feeling, as we do, that there is a class of molders who would make excellent machine operators, we are anxious to reserve for them, if possible, the opportunity to operate any machine. I feel certain could the foundrymen be disabused of the idea that the molder will exert himself to limit the production of the machine, assured that, on the contrary, he will do his best to make it a success and to develop it, that much of the opposition which now exists against employing molders as operators would be wiped out and each would profit thereby.

There is just one point which Mr. Black raises which I haven't touched upon. You see that the sentiment at the headquarters of the union is opposed to limitation of

output, just as I have said. Yet, there is the desire to prevent the abuse of power or advantage on the part of the employer, and there I stand with the union if we mean the same thing. Mr. Black further says:

> I believe at all times that the trade union is justified in protecting its members against arbitrary exactions on the part of employers. I think you will agree with me that there is a point beyond which it would be unfair to drive a workman, and any attempt to do so should legitimately be opposed.

Mr. Black is perfectly right. No workman should ever be driven. I wouldn't respect one who was, if he was doing what was right.

I think that the paragraph I have just read expresses a proper use of the collective power of the union. The union, acting through its body politic, should fulfill the paternal function. It should check abuses of its membership, whether they originate without or within the union, and I am not ready to deny that there are abuses from without. There are unfit officers of corporations who disgrace the great interests they direct. When such a man abuses the powers conferred upon him by his stockholders, using some unfair advantage over his employees, which he plumes himself is smart, let the union call public attention to his distinguished asinine ability by resenting his action, and it will be found that he is just a common man, perhaps uncommonly com mon. That man is not a "capitalist." Neither he nor his fellows are the "money power." The money power is simply and solely the working strength of the community.

It has been said, and I think proved, that there is not tangible wealth of all sorts in existence sufficient to keep the world alive for one year if we all stopped working. Therefore, let every man work according to his ability. Let no man seek to do less than he can, nor prevent his fellow man from doing so.

If a machine, as a molding machine, introduces a means whereby a less skilled man can do better work and more of it than the skilled had done before, I say to the local unions, do not act inconsiderately in trying to prevent this or any part of it, for it adds to the wealth of the world, to my wealth and to your wealth; and I say just one last word to the men who are tempted to try to do the impossible and to see things not as they are, but as they are said to be, stop reading yellow journals, which, for their own selfish interest, hang out gaudy banners on their side show tents and parade "barkers" at their doors, proclaiming themselves a "workingman's" friend. They are your worst enemies. Their solicitations to discontent and their false hearted through brilliant cartoons are like painted women, they are not what they seem. Read only the best, you deserve to. Be only your best, you can afford nothing else. Do only your best. If you can't do it with a rammer, take a molding machine.

The McClintic-Marshall Construction Company.

Through the courtesy of H. H. McClintic, vice-president and general manager of the McClintic-Marshall Construction Company, a representative of *The Iron Age* was recently shown through the company's extensive works, located at Rankin Station, Pittsburgh, Pa. The plant occupies a site of 13 acres, and lies between the main line of the Baltimore & Ohio Railroad, Pittsburgh & Lake Erie Railroad and the Monongahela River. The main building, used as a fitting up and riveting shop, is of steel construction, and covers about 2½ acres. Special care has been taken in the construction of this building to afford ample light and ventilation. It is commanded by eight electric traveling cranes of 5 to 25 horse-power capacity.

The equipment in this building is modern throughout, including the largest and best makes of punches, angle shears, plate shears, multiple punches, rack punches, beam copers, straightening presses, plate planers and rotary planers, all motor driven. There are a large number of stationary and portable pneumatic riveting machines, air hoists, air motors and reamers. The plant is particularly well equipped to turn out reamed work. The reaming outfit consists of 28 radial reamers, mounted on steel girders, each reamer being driven by an independent motor. Included in the equipment are two traveling gantrys for riveting.

Adjoining the main building is a brick building with steel trusses, columns, &c., containing the templet shop, power house, lavatories for the workmen, tool room, machine shop and blacksmith shop. The power house contains a number of Westinghouse gas engines and electric generators and Ingersoll-Sergeant air compressors. No steam whatever is used about the plant. The templet shop, machine shop and blacksmith shop are finely equipped. The receiving yard is equipped with two 70-foot traveling cranes of 15 and 20 tons capacity, and the shipping yard with two locomotive cranes.

The erection of this plant was started in February, 1901, but a good deal of work was turned out before the buildings were under roof. The company are about to make an addition 110 feet long to their main building, which will very much increase their capacity. They have almost completed the erection of a very commodious office building of brick and steel construction, four stories in hight. The basement will contain dining rooms for employees and officials, kitchen, toilet rooms and other accessories. The first floor will contain general offices, while the second and third floors will be devoted to drafting room purposes, each floor having facilities for accommodating 50 draftsmen. On the top floor will be the blue print room.

About three years ago the McClintic-Marshall Construction Company took over the Pottstown Bridge Works, and have since operated this plant. Since being acquired by this company many improvements and additions to the Pottstown works have been made and the capacity very much increased. At the present time the McClintic-Marshall Construction Company have facilities for fabricating about 4000 tons of material a month at their Rankin works, about 3000 tons a month at their Pottstown works, or a total of 7000 tons a month for both plants.

Within the past year the company have secured some very large jobs, and at the present time are operating the Rankin and Pottstown works to full capacity, and have a great deal of work ahead. Some of the large contracts that have lately been completed, or are now being built, are the steel buildings for the Standard Steel Car Company, at Butler, Pa., 3000 tons; New York Ship Building Company, Camden, N. J., 12,000 tons; Farmers' Bank Building, Pittsburgh, Pa., 4000 tons; Marshall Field & Co.'s buildings in Chicago, 7000 tons; while at the plant of the Union Steel Company, Donora, Pa., the McClintic-Marshall Construction Company have already executed work, and have under construction at the present time buildings, ore bins and other equipment that will require all told about 15,000 tons of steel. The company erected all the steel buildings at the new steel plant of the La Belle Iron Works, Steubenville, Ohio; also for the Alan Wood Company, Conshohocken, Pa., about 3000 tons; Clairton Steel Company, Clairton, Pa., 4000 tons; Youngstown Iron Sheet & Tube Company, Youngstown, Ohio, 5000 tons, and have a large number of girder bridges to be built for the Pennsylvania Railroad, New York Central, Chicago, Milwaukee & St. Paul, and other roads. The officials of the McClintic-Marshall Construction Company are C. D. Marshall, president; H. H. McClintic, vice-president and general manager; W. S. Mitchell, secretary and treasurer. W. M. Sterrett is manager of the Pottstown Works.

Some very extensive improvements and additions are contemplated at the W. Dewees Wood Company Works of the American Sheet Steel Company, at McKeesport, Pa. A resolution has been introduced in the city councils providing for the vacation of Blackberry alley and Market street for the use of the mill. The company now control all the property within the block bounded by Walnut and Market streets, Second avenue and Monongahela River. The plant occupies about half of that territory, but it is the intention of the company to extend the mill over the whole block. It is expected that the capacity of the plant will be doubled.

Pacific Coast News.

SAN FRANCISCO, CAL., November 11, 1902.—We have had very heavy rains since my last communication, which have been of great benefit to the agricultural and horticultural interests of the State. They have helped the citrus crop, lemons especially, and have put the ground everywhere in good condition for the plow. In anticipation of a good year for cereals our agriculturalists have purchased heavily of agricultural implements, &c., and the agents of Eastern machines and our manufacturers at Benicia, Stockton and San Leandro, &c., have had the best year on record. The high price of wheat—$1.30 to $1.35 per 100 pounds for shipping wheat and 5 cents more for milling—has given our farmers the best year they ever had for 20 years, and the people generally are prosperious and have money to spend. I do not believe that general trade was ever in better condition than it is to-day.

One of our principal drawbacks here is the impossibility of getting supplies. Some of the new era buildings which San Francisco is getting up have had to remain for months without a stroke of work being done on them, and have only started up in real earnest recently. And every week, or every couple of weeks, some new skyscraper is planned, either hotel or office building, so we will have to make the same complaint for some time to come. In fact, the city is growing faster than it has grown since the 80's and the business portion is being rebuilt by degrees. Still there is lots of room for improvement, and if the new movement be kept up better provision will have to be made for supplying the needs of our builders in the line of structural steel.

Large quantities of merchant iron, steel, pipe, wire, &c., continue to arrive from the East via Panama, while the imports by rail have been the heaviest that we have seen in a long time. The last steamer from Sydney, the "Sonoma," had 580 ingots of Australian tin. We have had some large supplies from the Straits Settlements. The great steamer "Korea" on her last trip hither brought 995 ingots, but others have brought none.

The export business continues fair, with now and again some specially large shipment. For instance, the Kosmos line steamer "Denderah," November 6, had for Rio de Janeiro 807 packages machinery, valued at $33,500. The same vessel had, strange to say, machinery valued at $1730 for London. The "Korea," which took out on the 7th a merchandise cargo valued at nearly half a million dollars, had bicycles valued at $1492 for Japan and at $600 for Manila, machinery valued at $830 for Japan, $770 for China and $2095 for the Philippines, matches valued at $379 for China, hardware valued at $510 for the Philippines and $69 for China, wire valued at $60 for Japan, 20 kegs of nails valued at $67 for Manila and 36 packages of sewing machines valued at $995 for Japan. She had also 436,070 pounds lead valued at $10,082 for China. The "San Juan," November 1, had machinery valued at $4470 for Central America. The "America Maru," October 30, had hardware valued at $575 for Japan, $1455 for China and $50 for Manila, sewing machines valued at $175 for China, bicycles valued at $1765 for Japan and $150 for Manila, machinery valued at $125 for China and a sample of machinery for Tonquin. She had 14,110 pounds of sheet lead valued at $413 for China. The "Curacoa," November 7, had machinery for Mexico valued at $3386. The "Sonoma" had machinery valued at $4658 for Australia and $3635 for New Zealand. She had bicycles valued at $540 for Australia and $116 for New Zealand. The "Nebraskan" for Honolulu on November 11 had steam pumps valued at $10,349, machinery valued at $782 and iron pipe valued at $1310. The "Archer" for Honolulu November 12 had machinery valued at $6006, steam pumps valued at $1213 and street rollers valued at $3500.

By the time that this communication reaches your readers one of the greatest manufacturing institutions in the United States, that of the American Steel & Wire Company, at Sixteenth and Folsom streets, in this city, will be in full working order. By that time all the machinery, &c., will have been removed from North Beach and the work will be going on in every department. The warehouse has capacity for 12,000 tons of merchandise, and 10 to 12 cars can load and unload at a time. Geo. H. Ismon, the Pacific Coast sales agent, may be proud of the celerity with which the work of construction has gone on under his management.

The Pacific Coast Steel & Wire Company, who have the biggest capitalists of the State among their stockholders, will have their plant in Oakland on the banks of the estuary. The general manager will be Frank L. Brown, so long and favorably known by the hardware trade of this city and coast. J. O. L.

Mechanical Stokers in Steel Mill Service.

Perhaps the severest character of load found in modern steam supply service is that encountered in the operation of steel rolling and slabbing mills. The fluctuations in the demand for steam are not merely of the nature incident to a street railway load, which is usually considered of maximum severity, but they frequently involve the capacity of the entire plant. In one American steel plant slabbing mills have recently been put into operation consuming as much as 2000 horse-power during the working of a large steel bloom. This load is approximately uniform until the bloom leaves the rolls, when it instantly decreases to that of mechanical friction only.

It is apparent that in order to effectually accommodate these excessive variations in steam supply either a considerable storage capacity must be provided in the boiler equipment, permitting uniform firing, or quick steamers must be employed, fired by some form of mechanical stoker. At the present time the latter arrangement is rapidly coming into use, with the result that fluctuating loads are readily anticipated and cared for by control of fuel combustion. This control may be rendered automatic when mechanical draft is employed in connection with the boiler and stoker equipment. A prominent example of this arrangement is offered in the plant of the Lukens Iron & Steel Company, recently described, which comprises 5700 horse-power capacity of Babcock & Wilcox water tube boilers equipped with Roney improved duplex stokers and a complete mechanical draft outfit. In this plant the speed of the fans and the position of the flue dampers are automatically controlled by the pressure of steam in the supply main, thus proportioning the rate of combustion to the steam demand. In the operation of this plant it has been found unnecessary to continue the signal system formerly in use between fire room and slabbing mill, and the heaviest demands for steam are readily provided for by the automatic arrangement for control of draft in connection with the mechanical stokers.

One of the pioneer industrial establishments to adopt the water tube boiler mechanical stoker outfit for steel mill service was the Carnegie Steel Company, who, a dozen years ago, installed the first Roney stoker in their Homestead Works. At the present time they have in use nearly 25,000 horse-power of boilers equipped with these stokers. The Carnegie Company have also had much experience with other mechanical stokers, but recent large orders for the Roney type indicate their preference as a result of competitive tests. The Lackawanna Steel Company have also adopted the Roney stoker for their plants at Lebanon, Pa., and Buffalo, N. Y., where the steam plant is arranged so as to be fired either by coal or blast furnace gas with equal efficiency. The gas is introduced above the grates in such a manner that both gas and coal may be burned at once if desired, the proportions being regulated according to the demand for steam and the quality and quantity of the gas supply. The failure of the gas supply in no manner interferes with the operation of the plant, as the coal firing is immediately resumed without interruption.

Many interesting arrangements of this nature are in use, but the solution of the problem of efficient boiler firing under heavily fluctuating loads rests entirely with the mechanical stoker. It is significant of the high economy and utility of the Roney type that it has been adopted by numerous steel companies to the extent of 100,000 horse-power.

Metal Working Machinery.

Abstract of United States Census Report.

WASHINGTON, D. C., November 18, 1902.—The Census Bureau is about to publish a statistical and technical report prepared by Expert Special Agent Edward H. Sanborn, upon the production of metal working machinery in the United States during the census year. The classification employed in this report is designed to embrace distinct types of tools or machinery and the chief difficulty encountered has been the definition of the products which it was designed to include and the determination of the limits of the group of industries manufacturing this class of machines. Inasmuch as this is the first attempt to treat metal working machinery separately, it is not possible to make any comparison between figures for 1900 and previous census periods. It is a matter of common knowledge, however, that the manufacture of metal working machinery, and more especially that part of it commonly designated as machine tools, has grown steadily during the past ten years, the increase being both in number of establishments and value of products.

The term "metal working machinery" is so comprehensive and so elastic that it might readily be stretched to embrace everything from a rolling mill to a watchmakers' lathe. The classification naturally narrows itself, however, to a few distinct types of machines, the uses of which are well defined and the designations of which are clearly established among the manufacturers. The term "metal working machinery," as used in this report, is therefore understood to embrace power operated machines for working metals in the form of bars, rods, wire, plates, sheets or castings, excluding such machinery as is used in the production of the metals themselves in these various forms. Rolling mill machinery might properly be considered as "metal working," but the equipment of a rolling mill embraces so many auxiliary appliances, many of them equally applicable to other industries, that any attempt to separate the machines strictly devoted to the working of the metal itself would be confusing, and would convey no correct idea of the amount of machinery manufactured for this particular branch of production. Furthermore, much of the machinery used in rolling mills is made in establishments where other products are also manufactured, and the distinctive character of the industry is thus obscured. With the exclusion of rolling mill machinery, the manufacture of machines for working metals is a well defined branch of industry, and one in which records are customarily kept with detail and accuracy frequently lacking in many other lines of manufacture.

Statistics of the Industry.

During the census year 397 establishments were engaged in the manufacture of metal working machinery as defined in this report. Their capital aggregated $54,293,812, and their products of all kinds, including custom work and repairing, amounted in value to $44,385,229. Following is a summary of the industry by States showing the number of establishments, the capital employed and the value of the product:

State.	Establishments.	Capital.	Value of product.
Connecticut	48	$8,374,901	$5,729,766
Delaware	6	2,197,106	1,730,719
Illinois	42	2,821,655	2,657,277
Indiana	7	245,480	219,795
Iowa	4	192,117	273,501
Massachusetts	56	4,990,723	4,676,475
Michigan	15	616,293	551,846
Minnesota	3	36,095	36,475
Missouri	3	8,300	16,152
New Hampshire	5	268,000	262,669
New Jersey	54	5,640,569	4,408,860
Ohio	68	11,171,334	10,012,739
Pennsylvania	31	11,179,822	6,989,252
Rhode Island	18	2,977,598	3,515,499
Vermont	4	474,900	354,832
Wisconsin	10	691,319	662,060
All other States*	12	700,363	807,555
United States	397	$54,293,812	$44,385,229

* Includes establishments distributed as follows: California, 2; Georgia, 1; Kentucky, 2; Maine, 2; Maryland, 2; North Carolina, 1; Oregon, 1; Washington, 1.

It will be noted that Ohio, with 68 establishments, 6123 wage earners and an aggregate of products valued at $10,012,739, ranks first in these items, and that the capital invested in the industry in that State, amounting to $11,171,334, is but a few thousand dollars less than the capital reported by Pennsylvania. With $11,179,822 of capital and only 31 establishments, Pennsylvania stands second in value of products, the total for the State being $6,989,252. Connecticut ranks third, with 48 establishments, $8,374,701 of capital and products valued at $5,729,766. So far as products are concerned, Massachusetts comes next, with 56 establishments, $4,990,723 of capital, and products valued at $4,676,475. New York shows 54 establishments, with $5,640,569 of capital and $4,408,860 of products. It is worthy of note that among the States that figure prominently in this industry Rhode Island shows the largest number of wage earners and the greatest value of products in proportion to the amount of capital invested. In that State there were 13 establishments making metal working machinery, with $2,977,598 of capital, employing 2966 wage earners, and producing machinery of an aggregate value of $3,515,499. This is the only important State in which the value of the products was in excess of the amount of capital invested.

Following is a statement of the number and value of each type or class of metal working machines manufactured during the census year, so far as it has been found practicable to classify them:

Number of establishments reporting	397
Hammers—Steam, power and drop:	
Number	857
Value	$671,287
Forging machines, including bolt headers and all other machines for forging hot metal with dies and by pressure:	
Number	821
Value	$424,774
Stamping, flanging and forming machines for plate and sheet metal:	
Number	7,895
Value	$1,180,960
Punching and shearing machines:	
Number	5,269
Value	$1,219,605
Bending and straightening rolls:	
Number	914
Value	$202,230
Riveting machines:	
Number	202
Value	$139,295
Lathes:	
Hand—	
Number	3,945
Value	$306,081
Engine—	
Number	12,089
Value	$4,451,867
Turret, including all automatic or semiautomatic lathes for making duplicate pieces—	
Number	3,687
Value	$2,449,121
Boring and turning mills, or vertical lathes:	
Number	534
Value	$1,123,314
Boring and drilling machinery, including all machines using drills or boring bars:	
Number	22,890
Value	$2,779,983
Planers, including plate edge planers:	
Number	1,543
Value	$1,808,955
Slotters and shapers:	
Number	3,076
Value	$1,136,350
Milling machines, including all machines using a milling cutter:	
Number	4,119
Value	$2,171,966
Sewing machines:	
Number	2,846
Value	$222,563
Grinding and polishing machinery, including all machines using abrasive cutters:	
Number	10,014
Value	$880,965
Bolt, nut and pipe threading and tapping machines:	
Number	2,088
Value	$698,362
Pneumatic hand tools:	
Number	6,751
Value	$143,325
All other metal working machines, value	2,726,901

All other products, value	16,375,956
Amount received for custom work and repairing	3,271,369
Total value of all products	14,385,229

The Great Centers of Production.

The tendency toward specialization has prevailed in Cincinnati perhaps more than in any other city, and has been one of the characteristic features of the rapid expansion of the machine tool industry in that city during the last ten years. During the census year there were in Cincinnati 30 establishments devoted to the manufacture of metal working machinery, almost exclusively of the classes generally designated as machine tools, and their aggregate product amounted to $3,375,436. In seven shops engine lathes only were made, two were devoted exclusively to planers, two made milling machines only, drilling machines formed the sole product of five establishments, and only shapers were made in three shops. Several other manufacturers made two or more of these classes of tools, but for the most part the industry was very strikingly specialized. Cincinnati manufacturers made during the census year 3924 engine lathes, out of a total of 12,089 for the entire country, or almost exactly one-third of the whole number. Out of 3076 shapers and slotters made in the United States, 1019, or nearly one-third, were made in Cincinnati. There were also made in the same city 816 milling machines and 1622 drilling and boring machines.

In Philadelphia 11 establishments reported an aggregate product of metal working machinery valued at $3,095,574. These products include a wide range of tools with less of the specialization.

Providence, R. I., ranks third in the manufacture of metal working machinery, the product of 14 establishments amounting, during the census year, to $2,929,141. Here, again, the industry is diversified rather than specialized. A large amount of automatic and semiautomatic machinery, such as screw machines, turret lathes and milling machinery of various types, is made in Providence, and these might be said to be the chief characteristic of the industry.

Hartford, Conn., stands next to Providence, and shows a wide range of products, among which automatic and semiautomatic machines might be mentioned as most significant. Eleven establishments in Hartford reported the production of metal working machinery to the value of $2,796,935.

Worcester, Mass., is another important center for the manufacture of machine tools, with much the same specialization that is manifest in Cincinnati. Twenty-four establishments reported for the census year products aggregating $2,009,357 in value. Engine lathes are one of the specialties in Worcester, and of these 2667 were made during the census year. These, with the 3924 made in Cincinnati, embrace more than one-half of the entire number of engine lathes made during the census year. Drilling machines of various types are another important item in the Worcester products, 4552 of these having been made during the census year.

While New York and Chicago are large distributing centers for machinery of every description they do not figure prominently in the manufacture of the classes of machinery embraced in this report.

While there has been in recent years a marked growth of this industry in some of the older centers—as, for example, in Cincinnati—at the same time there has been a widespread scattering of new factories in the smaller cities and towns in which the specialization also shows itself.

The effect of specialization in the manufacture of metal working machinery has been manifest in the improvement of the product and the economy of its manufacture. With but few exceptions, it may be said that the general tendency in machine tools has been toward more efficient machines rather than in the direction of lower prices. While the cost of some machine tools is higher now than it was five or ten years ago, the machine of to-day is the more economical because of its greater efficiency. The manufacturer, Mr. Sanborn states, who makes nothing but lathes, and manufactures 500 or 1000 of them in a year, is able, as a rule, to build them better and more cheaply than the maker who builds only a few in a long list of other tools. Concentration on the details of a single kind of machine or tool has been productive of marked progress in construction, and has led to the gradual evolution of new and advanced types.

Specialization in the manufacture of machine tools has followed closely in the differentiation of processes in other lines of industry, and thus there has been created a multitude of special machines, each designed to perform some single and often very simple operation. The bicycle industry furnishes a striking illustration of the readiness with which the machine tool builders met the demand for special tools to produce the various parts required in the construction of a bicycle. The advent of the chainless wheel called for a machine which would cut small bevel gears accurately, rapidly and economically, and such machines were quickly forthcoming. This, indeed, is a characteristic tendency of the machine tool industry—the effort to create new types of tools which will do more and at less cost than can be done by any of the ordinary appliances at the command of the machinist.

Principal Lines of Development.

Progress in machine tools and machine shop practice during the past decade has been marked by the following significant features:

1. The automatic and semiautomatic principles have been extended to new and larger classes of work than before.

2. The forming tool has become a recognized shop appliance.

3. The "oil tube drill" has been developed from an exceptional to a regularly used tool.

4. Compressed air portable tools have been developed substantially *de novo*.

5. The application of the power press has been greatly extended.

6. Electrical driving has come into general use.

7. The system of heavy portable machine tools in conjunction with a massive iron floor plate has been originated.

8. The grinding machine has been largely increased in size, power and extent of use.

Closely related to machine shop practice, though scarcely coming within machine tool classification, may be mentioned:

9. The development of traveling cranes.

10. The origin of high speed steels for cutting tools.

These lines of development may be discussed briefly in the above order.

1. The extension of the semiautomatic principle, as illustrated by the hand operated turret lathe, has been chiefly toward the execution of larger and heavier work, while the use of the entirely automatic turret lathe has been not only in the same direction, but has been adapted to entirely new classes of work. An illustration of the first line of development is found in several types of turret lathes, which, although employing certain methods of attacking the work which were not known before their advent, is nevertheless essentially an extension of the turret principle to larger work than had before been done by it.

An illustration of the second line of development is to be found in the "magazine feed" full automatic turret lathe. Prior to the advent of this machine the full automatic machine had been employed exclusively for making screws, studs, &c., from bar stock, which was fed to the machine through the hollow live spindle, the pieces being first turned, threaded, &c., and then cut off, when the bar of stock was fed toward the tool and another piece made, the operation continuing until the bar of stock was used up. The new machine applied the automatic principle to the machining of parts which, when in the rough, were already in separate pieces—*i. e.*, castings or drop forgings. In doing such work the finished piece must be taken bodily from the machine and a new rough piece inserted. This is a fundamentally different operation from merely pushing a long bar of stock to a new position. It is effected by the "magazine feed," the magazine being filled with rough parts by the workman, these parts then being automatically inserted in the machine and removed therefrom

when finished. The line of development exemplified by the machine first mentioned belongs to the entire decade, while that exemplified by the other belongs to its close.

Another line of development in this class of machines which should be mentioned is the use of multiple spindles, whereby the output of certain classes of work is very greatly increased. An outgrowth of this development has been the making of small brass screws and similar articles without money consideration, the chips cut off in making the articles being accepted as sufficient payment for doing the work.

2. The use of the forming tool goes back of the decade under consideration, but its use prior to 1890 was chiefly, if not entirely, for the making of articles from very soft composition castings, examples of the work being seen in the caps of salt and pepper boxes. The application of the principle to harder material came about in connection with the bicycle industry, one of its final applications to articles of steel being in the making of bicycle wheel hubs. If this is not the first application of the method to steel, at least it familiarized the mechanical public with it, and from this it has come to have quite an extended application.

3. By the "oil tube drill" is meant a drill, either flat or twist, having an oil tube or oil channel leading to or near its point, through which a current of oil may be forced to lubricate and cool the cutting edges and to wash away the chips. It is used chiefly for deep drilling in steel and usually in machines of the lathe class, in which the work revolves against a fixed drill, although the arrangement is also used in upright drilling machines, in which the tool revolves. The history of this appliance is almost exactly parellel to that of the forming tool. It was known and used to a limited extent before 1890, having been first used for the drilling of gun barrels; but its more extensive application must, like that of the forming tool, be credited to the bicycle industry, the development of the two tools being, in fact, simultaneous. The forming tool having been successfully applied to the machining of the outside of bicycle wheel spindles, it was found that a portion of the gain due to its faster action was lost because the simultaneous drilling of the hole required more time than the work upon the outside of the piece. This condition of things led to the adoption of the oil tube drill for this work, and from this application the use of the appliances has become widely extended. Of the two, the oil tube drill is no doubt the more important. The increasing use of hollow spindle lathes and automatic and hand operated turret lathes, in which the spindles are necessarily hollow, not to mention milling and other machines having hollow spindles, has given a wide field of usefulness to this tool.

4. The numerous class of small and unpretentious pneumatic tools which came into prominence and extended use during the decade under review may, it is quite possible, be looked upon as the most important single machine tool development of the decade. Of these, the first in order of importance, as well as of time, is the pneumatic hammer. Originally devised as a substitute for the hand hammer and chisel in the machine shop, foundry and in stone cutting, it has extended its field of usefulness to many other fields, and is to-day an indispensable tool in shipbuilding and in the erection of steel frame buildings. Of the general class of compressed air tools, the next in importance to the hammer is, perhaps, the rotary drill, which, in its numerous forms and applications, has introduced mechanical power in place of hand labor for classes of work to which the application of mechanical power seemed almost hopeless. These and numerous other applications of compressed air to machine and similar work stand almost wholly to the credit of the decade 1890 to 1900, the hammer alone having been in use prior to 1890.

5. The great expansion in the use of power presses which has taken place during this decade must be credited largely to the growth of the electrical industries. The advent of the laminated armature for electric generators and motors called for accurately made punchings of sheet metal of a size and in numbers previously unknown. The power press furnished the natural method of making them, and in its development the capabilities of the machines were demonstrated as they had never been before.

6. The electric motor as a means of driving machine tools was first seriously proposed about or shortly before the middle of the decade. The innovation obtained a foothold, and advantages which were not foreseen were found to attend it. It has become the accepted method of driving factories (*a*) which are composed of many departments, the flexibility and economy of the system in distributing power over a considerable area from a central station being here the factor of dominating importance, and (*b*) those which are of a nature requiring tools and machines to be located at considerable distances apart, especially if they are also to be intermittently operated. It has also made rapid progress in machine shops, to which the above limitations do not apply, though in such applications opinion regarding its merit is still unsettled. A leading controversial point is the attachment of individual motors to each machine tool *vs.* group driving of several machines through a single motor and a line shaft. There are well defined conditions under which each method is suitable, but there is still a wide intervening field of debatable ground. As a matter of fact, in this field the individual motor is making rapid progress, more so, perhaps, than can be readily explained.

7. Like the increased development of power presses, the floor plate tool system of attacking heavy work must be credited to the electrical industries, which in this instance, curiously enough, furnished both the work for which the system was first devised and the means for doing the work. It was the machining of the ring or maguet frames of large electric generators to which the system was first applied, and the electric motor supplied the only practicable method of driving the tools which form part of the system. The system has not yet found much application outside of electrical works, although a beginning has been made, and this growth will doubtless continue.

8. The grinding machine was first devised during the past decade as a means of doing superior work, but it was not long before it became evident that it was a source of economy as well as a means of securing superior workmanship. The full significance of this was, however, slow to be realized, and it was not until toward the close of the decade that the movement began toward a very marked increase in capacity, weight and power of the machines.

9. In no feature of machine shop practice has there been greater progress in American shops during this decade than in the provision of crane facilities. Twenty years ago the absence of these facilities was a national reproach, but to-day there is undoubtedly better crane service in the United States than exists elsewhere. This development is to be credited to the electric motor, without which it is at least doubtful if the present stage of progress could ever have been reached. The mere transmission of the power required for cranes of present capacities by the old square shaft or flying rope would be a serious problem. Electricity furnishes, in fact, an ideal method of driving cranes, and the necessary installation of an electric plant for operating cranes has no doubt greatly furthered the adoption of electric power for other purposes.

10. Within the last few years discoveries have been made whereby tool steel subjected to various chemical treatments after forging is made to endure cutting speeds which before were impossible. Like all other useful things these steels have certain limitations, and it is too early to state definitely what their ultimate economic importance will be. It is reasonably certain, however, to be considerable. W. L. C.

The regular bimonthly settlement of the bar iron wage scales was made at Youngstown, Ohio, last week It was found that the average price of shipments of iron bars in September and October did not entitle puddlers and finishers to any advance in wages for November and December.

The Iron Age

New York, Thursday, November 20, 1902.

DAVID WILLIAMS COMPANY, - - - - - - - - PUBLISHERS
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Trades Unions and the National Guard.

An event of unusual importance occurred last week in Schenectady, N. Y., the result of which will be watched with the utmost interest by both the employer and employee. In the history of labor troubles it is the first case of this nature, and, therefore, since it marks a precedent, its effect will be carefully observed.

A man named Potter, having served in the Spanish War, enlisted in the National Guard upon his return home. During the recent strike at Albany his company was called for service and he was obliged to go. When the troubles ceased he went back and was first expelled from membership in his own union and then discharged by his employers, a firm of painters and decorators. The reason given openly for his expulsion from the union was that he belonged to the National Guard.

Up to this writing this is the whole case in a nutshell, but the end is not yet. If the labor unions throughout the country indorse the action of the Schenectady branch, Potter cannot get work in any city or town in the United States where an organization has been perfected. No matter what his character or ability may be he will be completely and effectually ostracised. But we believe the labor unions will think twice before taking any such stand. Such an indorsement by them would mean that they had no sympathy with the National Guard, and that any man who joined the militia would lose his job. It would proclaim their emphatic condemnation of the citizen soldier, and their contempt for an organization that makes for peace and for peace only. During the past few months we have heard much regarding the quiet and law abiding characteristics of the striking miners of Pennsylvania, and their ability to handle their own affairs. This they certainly proved they could do, in their peculiar way, with the aid of dynamite and the fire brand. If they really respected the laws and customs of the community where they lived, then the presence of half a dozen soldiers or of Xerxes' army should cause them no uneasiness. Since the Guard has been instituted solely to preserve peace, and since the labor union would disrupt the Guard if it could, then it follows as a self evident conclusion that the union has no use for an organization whose foundation principle is the preservation of peace. This is the rock upon which anarchy has been reared.

From one point of view the action taken by the Schenectady union is welcomed by those who feel that organized labor has been going too far in arraying itself against constituted authority. This case will not only have a strong effect on public opinion, but it will also serve a useful purpose in demonstrating how far some members of trades unions are willing to go in opposing the means adopted by society for the preservation of peace and order. The question will very probably be carried into the courts and an effort will be made to determine whether a remedy cannot be found for preserving the rights of a citizen. It seems incredible that any organized body can be permitted to exercise so great an influence as to prevent a man from securing employment on such grounds as appear in this case.

It is believed that included in the membership of trades unions many will be found who are not in sympathy with action of this character. Some indication of this is seen in the printed discussions of labor organizations which have held meetings since this occurrence. Men who have been enthusiastic supporters of trades unions have declared that they are opposed to the movement to prevent workingmen from serving in the ranks of the National Guard. They take a patriotic stand and believe that every man should be left free in a matter of this kind regardless of his affiliation with a trades union.

In the case of Potter he may be hounded from pillar to post, with absolutely no chance to earn a livelihood at his trade, if the union so wills it. He could not get out of the Guard, as he had enlisted for a certain period and must serve his time. He could refuse to obey the summons and then be tried by the military authorities for desertion, and suffer imprisonment or be shot. When called upon he had no choice and there was no way out of the predicament. His only course was to go with his company and obey orders. The State Militia is composed of all able bodied citizens between the ages of 18 and 45. Further, whenever necessary, upon the order of the Governor any citizen may be drafted for military service and compelled to serve. If he does not report for duty within 24 hours he is deemed a deserter and dealt with as prescribed in the articles of war of the United States. We can imagine that a crisis might arise when the very men who expelled Potter from his union would be called upon to perform military service. We have a hearty and an abiding conviction that they would shoulder a musket and tramp to the scene of action, there to suppress, possibly, a strike riot. They would go for the simple reason that men of their caliber are not likely to stand up and be shot just to prove their belief in a principle.

The Opposition to Eight-Hour Legislation.

Although to all alert and intelligent observers the attitude of the National Association of Manufacturers respecting the relative positions of capital and labor is well known, it is gratifying to read the words of George H. Barbour, chairman of the Legislative Committee of the association, setting at rest the false story circulated that the association, or President Parry, has any intention of fighting or any desire to fight organized labor. "The National Association of Manufacturers," says Mr. Barbour, "is interested to protect not only the manufacturers but their employees, and they are opposing the [enactment of an] eight-hour law on the ground that it is far reaching and is liable to affect the employee [adversely], as the general manufacturer does not pay for an eight-hour day's work the same price that he does for a ten-hour day's work."

The theory upon which the faulty structure of the present day labor union seems to be built is that labor is a necessary evil and that the less performed the greater the felicity and the higher the accomplishment of the laborer, while the reverse—within normal limits—is actually the case. And he who has been compelled to be idle without the means of sustenance best knows the dignity and blessing of labor. The idea that the fewer hours one works or the less he accomplishes the more room will there be for the employment of others of the organization bears bitter fruit and will furnish less and less nourishment for the hungry workman the longer he

depends upon its barren husks. The rules which now govern many labor organizations have a tendency to develop dependence and to result in a weak character. They kill self reliance. The sentimentality to which such free rein has been given recently that the laborer is "a poor, oppressed, downtrodden being" has been conceived in ignorance, no matter how good or noble the intention, and the self respecting workman should be the first to resent the imputation.

A little thought will convince one that to be effective any shortening of the hours of labor must be universal or loss and suffering will be entailed. Those familiar with the history of the eight-hour agitation in the spring and summer of 1886 among the packing interests of Chicago, who gave the system a fair and thorough trial, will be able to draw quick and accurate conclusions on this point. Business, like water, seeks a level, running from higher to lower elevations, and the manufacturers in endeavoring to prevent the enactment of an eight-hour law at this time are obviously working as much for the interest of the employee as for the employer.

Expansion at Chicago.

During recent years Chicago has expanded less rapidly, perhaps, than during its early period, and its policy has been more conservative; but this growth has been more substantial. In the last year, more especially during the last six months, there has been a wonderful quickening—in common with the rest of the country but in a more eminent degree—throughout commercial and manufacturing circles. Much of this growth is not apparent on the surface and will not be disclosed in statistics for some time to come, but it is one of the signs of the times that manufacturers of the East, especially in the iron and steel industries, heretofore without representation in Chicago, have established agencies and branches in generous measure at Chicago. The work has been quietly but effectively done, it being a recognition of Chicago's position as the commercial center of the Northwest, and it may be indeed an echo of the sentiment of a prominent writer, that "Chicago is destined more than any other city to overtake the expansion of London and to be the central mart of the American continent."

We referred about a month ago to the revival which has taken place in Chicago building operations, and the record of the month of October has substantiated this statement. In point of value the month of October was the greatest of any corresponding month within the past ten years, and next to May and June, the greatest of any month during the present calendar year. Permits were issued during October for the construction of 563 building improvements extending over, in round numbers, 17,500 feet, and involving a cost of over $4,000,000, being an increase of over $1,100,000 in cost as compared with the corresponding month last year. The withdrawal of the hight limit from buildings has stimulated improvements to a marked degree, and it is claimed by competent real estate authorities that the removal of the limit to municipal bonded indebtedness will further accelerate building operations.

Building projects developed during the week just closed have been of unusual interest and unusual magnitude, and when completed will make the locality and vicinity of Michigan and Jackson boulevards one of the greatest centers of municipal activity in the world. The number and magnificence of the buildings now in contemplation in the locality indicated are said to surpass anything heretofore undertaken at any one time in Chicago. These building operations will cause an expenditure of about $10,000,000, three of the projects involving upward of $7,500,000. The improvements projected embrace a hotel on the site of the Stratford, which is to be on the plan of the Waldorf-Astoria of New York; the Standard office building on the site of the Argyle apartment and the Leroy-Paine property, and a handsome edifice on the Whittemore property, in which the Thomas orchestra, the Central Church and the School of Music of the University of Chicago will be installed.

Another important improvement is the construction of a fine office building on the site of the Bryan block, at the northwest corner of La Salle and Monroe streets. It is proposed that this building shall be 12 to 16 stories high.

There is also much activity among the railroads by the purchasing of acre properties for terminal and other facilities. Various minor real estate transactions are also under way. Nor is this great awakening in real estate confined to the business center or to the city proper, there being much activity at Chicago Heights and in other manufacturing suburbs.

Bankers on Banking Reform.

The discussions in the convention of bankers at New Orleans showed a strong sentiment adverse to branch banking, and the retiring president has said since the convention adjourned that the sentiment was against an asset currency, or a currency not secured by a deposit of bonds. Branch banking is actually in progress within certain limits. Some of the New York State banks have by purchase or otherwise acquired a number of branches. There is more branch banking in the national system than is supposed. Large banks in the Northeast have bought controlling interests in banks in the West and South, which have become virtually their branches, though nominally retaining their independence. Banks that are thus acquiring branches are not anxious to have the practice facilitated and encouraged. The banks of the West and South are opposed to branches because it means more competition and smaller profits for them. The late Professor Dunbar proposed as a compromise proposition that banks should be authorized to establish branches, but only in their own States; a Chicago bank could have a branch in Southern Illinois, but a New York bank could not.

If branch banking would increase the amount of loanable capital in the West and South, and reduce rates of interest, the people of those sections might be expected to favor it. Unfortunately the matter is very little understood, and in the agricultural regions there is a good deal of fear of the "money power," and of financial interests in New York and Boston, so that the new departure does not even get the support of those who would most benefit from it. A writer in the *Outlook*, who describes a visit to Tuskeegee, Ala., says that a man who lends money there at 10 per cent. is a philanthropist; 1 per cent. a month is a more common rate. The United States is the only country that puts obstacles in the way of branch banking, and the only one in which there is a very great difference between money rates in the agricultural and the metropolitan sections. The complaint is now made of country banks that they remit too much of their funds to New York; the establishment of branches would have hardly any additional influence in this direction, but if the Eastern bank had a branch and an agent of its own in Arkansas or Nebraska more Eastern capital would be loaned, and on easier terms.

than now. A man in Kansas buys a bunch of cattle and gets his note discounted at the local bank, which gets the note rediscounted, and the borrower pays two profits. That money is much higher in the West and South than it is in New York and New England admits of no doubt, and there is no more doubt that this is due to the scantier supply of loanable capital in those sections, and that this would be wholly or largely obviated if the banks of the East could establish branches where capital is scarce, the proportion of borrowers is large and rates are high.

It is not so obvious why bankers should be unfriendly—if such they are—to the proposed asset currency. They recognize, and the people of the West and South recognize as they never did before this year's stringency, that it is the community and not the banks who need relief when money is tight. Experience here in former years, and contemporaneously in other countries, proves the entire safety of asset currency and its elasticity, and other proposals for imparting elasticity to the circulation promise very meager results. Canada has an asset secured circulation, which grows from year to year, and which expands every fall and contracts every winter.

A counter proposition has been made for an emergency circulation to be secured by the deposit of other bonds than those of the Government, and to bear a high rate of taxation so that it will pay to put them out only when money rates are very high. But this is not a proposition to prevent stringency; it is a proposition to prevent a stringency from going to very great extremes. Money would have to be high, with the prospect of remaining high for some time, before a bank would buy city and State bonds and deposit them for an emergency circulation on which a high tax would be paid. Again it is necessary to call attention to the fact that the banks do not suffer from stringency nearly so much as the people who borrow of them, and they have not a very powerful motive for relieving the stringency that is giving them a high return on their funds. What is desired is to make it worth while to the banks to put out enough circulation to avert a stringency, and with an efficient system of redemption there will be no inflation of the currency; the notes will go back to the issuing bank when not needed in business. Notes limited to the capital, or say 60 per cent. of the capital, secured by the bank's assets and a redemption fund, have been amply proved to be safe, and they would be issued in sufficient quantity to prevent an annual stringency which other measures would, at the very most, merely check.

The Advance in Wages of Railroad Employees

One of the important occurrences of the past week was the announcement of a 10 per cent. advance in the wages of all employees of the Pennsylvania Railroad Company who now receive less than $200 per month. The Pennsylvania Railroad Company, taking in the entire system, employ over 100,000 men, and the advance in wages is said to entail upon the company an addition of probably $7,500,000 annually to their labor account. The New York Central & Hudson River Railroad Company are also putting in effect an advance of a similar character. Other large systems are falling in line, and it is believed that within a short time the advance thus begun will extend to all Eastern roads. It is stated that the Western railroad systems are not likely to make a general advance of the same character, as the wages of their employees have been somewhat higher than those of the men on Eastern railroads. Within the past two weeks the Western railroads have, however, made a slight advance on several classes of their workmen. The railroad companies are thus rather tardily falling in line with industrial establishments, in advancing the wages of their workmen. Manufacturing companies found it necessary long since to raise the wages of their employees to meet the improved conditions in productive industries, and also to enable them to meet the advanced cost of living.

It is not to be expected that the additions thus made to the expense of operating railroads will be wholly borne by the railroad companies, which would then result in a reduction of their earnings. The more rational conclusion is that freight rates will be advanced to cover the additional cost of operating. In fact, this has already been foreshadowed by officials of some of the railroad companies, who have cautiously advanced their opinion that this may be done, possibly by way of preparing the public mind for a change in rates if that should finally be decided upon. Advanced rates would further be a natural outcome of the railroad situation, in view of the fact that the facilities of all railroad companies are heavily overtaxed to handle the immense traffic which is now being poured upon them. In probably no other line of commercial activity would such an opportunity to raise prices be overlooked. If an advance in railroad rates would, to some extent, check the heavy movement it would not be an unmixed blessing, as possibly a great many consumers who are now suffering from the nonreceipt of needed materials would then be better served. Many of them would possibly not object to paying, at least temporarily, a higher rate to secure better delivery.

If transportation rates should be advanced as expected, such a movement will further advance the cost of production in this country. It adds another element which must be reckoned with by those who are forecasting the future. It will probably be some considerable time until we are able to return to anything like the low level of cost of production which prevailed some four or five years since. Meanwhile, European countries are suffering from overproduction and wages are being reduced. It would therefore seem to be a matter of much gravity for this country to continue to add to the cost of production while our competitors in international trade are being placed in a position to undermine us very seriously. But any argument in this direction is absolutely futile while such conditions obtain as are now found in this country. We are obliged to face events as they occur and let the future take care of itself.

CORRESPONDENCE.

The Largest Roll Ever Cast.

To the Editor: I noticed in the issue of your esteemed journal for August 28, on page 38, an article about "The Largest Roll Ever Cast." The Donetz Iron & Steel Company, Droujkaffka, South Russia, have a plate mill, built in Germany, which has been running for about four years, with rolls 39⅜ inches in diameter and 157½ inches long (1 meter by 4 meters). Several weeks ago I saw at the Düsseldorf Exhibition a chilled plate roll 43¼ inches in diameter and 157½ inches long, weighing 32 metric tons, which is fully 20 per cent. heavier than the Garrison roll, and is likely to be, indeed, "the largest roll ever cast." FRANK THIEL.

SARTANA, SOUTH RUSSIA, October 15, 1902.

What Is Steel?

To the Editor: I am pleased to see that you are reprinting from the English technical journals the discussions on the subject, "What is Steel?" and I hope the matter will receive the attention in this country

that it deserves. It is not surprising that English steel experts should have protested against the decision of the Stipendary Magistrate of Sheffield in the case of the malleable cast iron forks sold under the name of steel. The analysis of the metal proves conclusively that the castings were white iron, subsequently treated to an annealing and finally case hardening process.

There is nothing reprehensible in the manufacture of such goods, but the growing practice of marking "steel," or "cast steel," on such articles is open to severe criticism. A few years ago bicycles were sold in this city which were made, I believe, almost entirely of malleable cast iron. Even the frame, which was a close imitation of a brazed steel tube frame, was said to have been cast in one piece in white iron. Sprockets, cranks and other parts were made of the same material. I think you can find, without difficulty, hatchets, axes and other tools in the market stamped with the name "steel" on them, which have been cast of white iron, then annealed and case hardened.

ALEX. E. OUTERBRIDGE, JR.

PHILADELPHIA, November 13, 1902.

The Southern Supply and Machinery Dealers' Association.

An enjoyable and largely attended meeting of the Southern Supply and Machinery Dealers' Association was held in Memphis, Tenn., on Wednesday, Thursday and Friday of last week. The important topics were discussed in executive session. There was no change in officers made. They are: President, C. B. Jenkins, the Cameron & Barkley Company, Charleston, S. C.; first vice-president, Levin Joynes, Southern Railway Supply Company, Richmond, Va.; second vice-president, Geo. R. Lombard, Lombard Iron Works & Supply Company, Augusta, Ga.; secretary and treasurer, C. B. Carter, Knoxville, Tenn.

The convention was called to order by President Jenkins and opened with prayer by Rev. F. P. Davenport. After the address delivered by President Jenkins, ex-Congressman Josiah Patterson made the address of welcome upon the part of the municipality, and J. A. Reichman of the Reichman-Crosby Company welcomed the delegates in behalf of the local dealers.

Hon. W. A. Mix of the Dodge Pulley Company, Mishawaka, Ind., was introduced to speak in the way of response for the manufacturers. Mr. Mix is very popular personally in the association, and in his speech said:

In behalf of the manufacturers, I express to you and the citizens of Memphis our sincere thanks and gratitude for the privilege you have so generously accorded us, and we cannot refrain from complimenting you upon the broad lines of your organization, combining, as it does, those who meet in the daily battle for business on the same battle field. Your interests are in common, and perhaps in no better way can you promote your mutual welfare and remove the sharp corners of business than by this personal contact and combined effort.

You here learn that your competitor is not woolly and is devoid of horns and entitled to the courtesies of commercial society, forever worthy of your steel. A wholesome respect for your competitors never fails to have a salutary effect on your efforts. There cannot be too close relations existing between the maker, seller and user, and such meetings and conferences will do more to bring about a satisfactory understanding of the mutual needs of these various interests than the expenditure of years of time and thousands of dollars.

The next feature in order of the programme was the report of President C. B. Jenkins. It dwelt on the general purposes and plans of the association and told something of the year's results. The report, in part, follows:

President Jenkins' Report.

One year ago some steps were taken by a few of our leading supply houses to see if it were possible to form an association such as we now have, for the purpose of coming in closer touch with each other and for bettering our condition in many ways. It is gratifying to me and affords me genuine pleasure to see assembled so distinguished a body of energetic, intelligent business men, possibly a number of them my competitors, but I feel I can truly say my friends and each other's friends. One year ago it was not so. The majority of us were known to each other by reputation only; but now by closer bonds of friendship and personal acquaintance.

We should feel encouraged by the liberal representation that we have here assembled. This is a day of concentrated effort, and we should apply such methods in our association, and by united effort we can mitigate many of our existing evils.

It should be our aim and desire to cultivate the most cordial relations with the manufacturers. We are each dependent upon the other. They look to us to distribute their products, and we in turn look to them for protection. When we have cause for complaint, I believe in the majority of instances the individual firm or corporation, if they are reasonably disposed, can settle same without resort to our Grievance Committee. We do not wish to pose as an association of kickers, but at all times be united to assert our rights, and I believe our rights will be respected by all first-class manufacturers. I shall not attempt a detailed report, as our secretary will furnish the same for the past six months. I cannot pass an allusion to our secretary without saying that he has been indefatigable in his work, and has been on the alert at all times to promote our interest. He has kept me pretty busy answering his letters, and to him is largely due the success we have attained thus far.

The supply and machinery business probably reflects the condition of general prosperity better than any line I know of, and speaking for the South, I believe that our supply dealers will record 1902 as one of the best for volume on record; since the first of the current year we have been buying on a rising market, and if the dealers have taken advantage of these favorable conditions their profits should certainly be above the average year.

The Southern States are on the eve of immense possibilities; there is no section of our grand country that so quickly responds to thrift, energy and enterprise as does the sunny South. We are harvesting a profitable cotton crop, which means for the South, in round figures, for raw cotton not less than $400,000,000; the song of the loom and spindle is heard is every hamlet; our forests are yielding large revenue from their timber industry; our coal and iron mines are simply taxed to the utmost on account of the enormous tonnage being sold, and manufacturing industries of all kinds are being established. What we lack is more capital to develop our vast resources, and I believe that when investors become better acquainted with the great possibilities in the South our development will be phenomenal. While we are thankful for our prosperity, our brothers North and West have no reason for complaint, as all branches of business have been so active that the great trouble is to obtain what you purchase, some manufacturers being sold up for many months. The products of the United States are sought after by the civilized world, and we are now invading Continental Europe at a rate that is causing the foreigner to feel uneasy; and if I am correctly informed, the trade balance in the past five years in our favor has reached the stupendous sum of $2,621,000,000.

The financial condition of the South is rapidly developing; reports from Washington and from the capitals of our Southern States show a continued increase in the number of banks being established; collections have been phenomenally good all over the country, which has encouraged financial activity; money was never more plentiful, and public confidence has never been stronger; the railroad reports show an increase in earnings of millions of dollars, due to an enormous increase both in travel and the tonnage handled.

We are pleased to report some additions to our roll, as shown by our secretary's report, and our total membership at this time is 30 firms.

Among those present were:

J. B. Browning, Ohio Valley Pulley Works, Maysville, Ky.
P. W. Browning, Ohio Valley Pulley Works, Maysville, Ky.
H. E. Coffin, J. H. Coffin & Co., Memphis.
F. Liedeel, Lidden Machine & Supply Company, Montgomery, Ala.
W. P. Thompson, C. T. Patterson, New Orleans, La.
Thos. Parnell, Westmoreland Machine Company, Pittsburgh, Pa.
C. Clyde Grissam, Brownsville, Tenn.
T. J. Hill, the Hill Machine Company, Anderson, Ind.
Levin Joynes, Southern Railway & Supply Company, Richmond, Va.
E. R. Coleridge, Chicago.
Jno. J. Vorhees, Vorhees Rubber Mfg. Company, Jersey City, N. J.
Geo. A. Smith, Smith-Courtney Company, Richmond, Va.
Samuel Moyer, Lunkenheimer Company, Cincinnati, Ohio.
Jas. Anderson, New Orleans.
D. H. Smith, New Orleans.
C. B. Jenkins, the Cameron & Barkely Company, Charleston, S. C.
Edward B. Booke, Ashcroft Mfg. Company, New York City.
R. P. Towner, Towner & Co., Memphis, Tenn.
H. H. Crosby, the Riechman-Crosby Company, Memphis.
J. A. Riechman, Riechman Company, Memphis, Tenn.
A. D. Scofield, J. S. Schofield's Sons Company, Macon, Ga.
Peter Blow, Southern Brass & Iron Company, Knoxville, Tenn.
G. F. Govell, Vorhees Rubber Company, Jersey City, N. J.
Frank Ohlen, Atlanta, Ga., E. C. Atkins & Co.
C. M. Fouche, Knoxville, Tenn.
Jno. R. Doyle, Nashville Machine Company, Nashville, Tenn.
Wm. R. Lee, Lee & Jackson Mfg. Company, Detroit, Mich.
D. J. Campbell and W. A. Mix, Dodge Mfg. Company, Mishawauka, Ind.
T. E. Mooney, Bradford Belting Company, Cincinnati, Ohio.
W. L. Chandler, Dodge Mfg. Company, Cincinnati, Ohio.
C. H. Johnson, Northampton Emery Wheel Company, Chicago.
V. A. Moore, Alabama Tube & Iron Company, Birmingham, Ala.
J. E. Brady, J. H. McGowan Company, Cincinnati, Ohio.
S. E. Dunn, Jersey City, N. J.
A. C. Langston, Jenkins Bros., Atlanta, Ga.
Chas. P. King, Atlanta, Ga.
H. W. Richards, Skelton & Richards Mfg. Company, Chicago.
Thos. H. Dickinson, N. Y. B. & Packing Company.
N. A. Gladding, E. C. Atkins & Co., Indianapolis, Ind.
B. M. Gladding, E. C. Atkins & Co., Indianapolis, Ind.
G. T. Broadhurst, Page Belting Company, Concord, N. H.
C. B. Carter, Knoxville, Tenn.
W. R. Patton, Saginaw Mfg. Company, New York City.
A. Boutelle, Saginaw, Mich.
Charles Fitzgerald Aaron, N. Y. Leather Belting Company.
I. F. Peters, Industrial League, Memphis, Tenn.
J. F. Donavan, Western Iron & Supply Company, St. Louis.
J. F. Capson, De Longjoy & Son, New Orleans, La.
R. H. Newman, Simmons Mfg. Company, Chicago.
S. M. Price, the Henry Walke Company, Norfolk, Va.
C. M. Houston, Houston, Stonewood & Gambol, Cincinnati.

Wednesday afternoon was taken up with an executive session, committee reports and the Question Box. The programme Thursday morning included several excellent papers, which were presented as follows: "How Can the Manufacturers Most Economically Distribute Their Product?" led by N. A. Gladding of E. C. Atkins & Co., Indianapolis; "Reciprocity," by Peter E. Blow, Southern Brass & Iron Company, Knoxville, Tenn.; "Advantages and Disadvantages of Quantity Prices," prepared by L. J. Lomasney of Peerless Rubber Mfg. Company, New York City, read by secretary; "Outlook for Approaching Year," John J. Vorhees, Vorhees Rubber Mfg. Company, Jersey City, N. J.; "The Effects of Prices on Consumption," by S. M. Price, the Henry Walke Company, Norfolk, Va.

The banquet on Thursday night, with covers for 200, following the theater party for the visitors of the evening before, was a duplicate in social magnificence of other entertainment features of the programme. W. M. Mix was toastmaster. The toasts on the programme were responded to as follows, and additionally several impromptu efforts and songs: "Industries," Col. I. F. Peters, Memphis; "The Ladies," Chas. F. Aaron of New York City, N. Y.; "Reminiscences," John J. Vorhees, Jersey City, N. J.; "Good Fellowship," N. A. Gladding, Indianapolis, Ind.; "Our Market," Chas. R. Houston, Cincinnati.

New Orleans was selected as the next meeting place, and the exact date, to be decided upon later, will be between April 1 and 15.

According to Henri Merou, French Consul at Chicago, who has just returned from a trip to France, the Franco-American Committee, who have had under consideration the establishment of a great French industrial school in the United States, have definitely decided upon Chicago as the most advantageous situation for such an institution.

Lake Iron Ore Matters.

DULUTH, MINN., November 8, 1902.—When the season closes this month it will be found that Fayal mine of the Mesaba range has not only surpassed its unrivaled record of last year, 1,656,973 gross tons, but has shipped 200,000 tons more. It will close the season with the enormous shipment of about 1,850,000 tons. This all comes out of three shafts, a milling pit connected with one of the shafts and an open steam shovel pit, in which milling is also carried on. The mine has this year shipped a lot of low grade siliceous ore that has been in the way of operations in the steam shovel pit, and this has contributed to its gain. A careful mixture of this ore has been made at the mine, in cars, with the result that a satisfactory grade has been maintained for the entire enormous shipment. Explorations have been steadily maintained at the Fayal and dead work has not been allowed to drag, with the result that the mine has now in sight a larger tonnage than at any previous time in its history, with more ore opened ahead than ever. To the close of 1902 this mine will have shipped, in the eight years of its existence, 7,425,000 gross tons. It was opened in the winter of 1904-5, and for four years the entire product was taken from underground. Now the bulk is from steam shovel and milling pits.

Included in the surprisingly large shipments from all ports for October, 3,311,426 gross tons, were 1,900,000 tons from the head of the lake, 777,000 tons from Ashland and Marquette, and 634,000 tons from Escanaba. This makes the total to November 1, 24,019,770 tons, which is 5,874,936 tons more than the previous year to the same date. With 2,000,000 tons for November, and this is probably about what will be reached, the year's total will be 26,000,000 tons. This is 2,000,000 tons more than my early season estimate, and 3,000,000 tons or more greater than Cleveland estimates of the same date.

November 4 ore was shipped from the new Hawkins mine of the Deering Harvester Company, over a 12-mile spur built since July 1. The mine will ship a trial lot of about 10,000 tons taken out of underground development since midsummer. A steam shovel will be taken in and a contract for the removal of 250,000 cubic yards of surface carried out.

Local parties associated with W. P. Snyder have formed the Standard Mining Company, and are to take up some lands. They will explore a 40-acre tract close to the Mountain Iron mine. Some other land close to the Mountain Iron containing 2,500,000 tons of high phosphorus, good structured, has just been taken under option by a large interest. A little ore is being found near Biwabik, some on each side the village, and some east of the Stephens mine. No new explorations are starting on the western end of the range in Itasca County, and many at work there will shortly pull out.

In a general way milling managers have begun to prepare for the biggest year in their history, and some are setting the output of the coming year at 28,000,000 tons. It is very liable to be at least this if no untoward circumstance occurs. Already arrangements are under way for more extensive stockpiling than before and the number of new mines that can make a large production will be more than in any past year in the history of the lake region. These new mines will be a very important factor in the development of the region. Many of them are on the lines of the Great Northern road on the Mesaba, and that road will increase its tonnage exceedingly next year. It is now preparing to build a third ore dock, and is ordering material. It is understood from Mr. Hill that if it was not impossible to get steel on time he would use metal in this dock to a very considerable extent. Up to this time the metal portions of ore docks have been limited to spouts and fastenings. He would use it for the structural portion of the erection. Though, perhaps, not yet, this is sure to be done in a short time.

The Cleveland Cliffs Company have started pumps unwatering the Barasa, their latest option for lease and purchase. They will make a careful examination underground and commence actual mining as soon as possible. In connection with this purchase the same company have taken the Swanzey properties of the Escanaba River Land & Iron Company at option for purchase for $200,000. These have been examined somewhat and will be further examined as soon as possible. The company are laying out an immense amount of work on both the Marquette and Mesaba ranges, and may also enter the Vermillion at no distant day. D. E. W.

The Detroit Foundry Labor Conference.

Following is an abstract of the report of the Detroit conference published in the November issue of the *Iron Molders' Journal*, the official publication of the Iron Molders' Union of North America:

A national conference between representatives of the National Founders' Association and the Iorn Molders' Union was held in Detroit, Mich., from October 8 to 11 inclusive. This conference was looked forward to with considerable interest by the members of each association, for it was expected that vital issues would be discussed, and that a serious effort would be made to reach an agreement upon subjects which, for lack of agreement, were danger points in the relationship of the two bodies.

The National Founders' Association was represented in the conference by W. D. Sargent, president; A. C. Pessano, I. W. Frank, W. H. Pfahler and John A. Penton, secretary.

The Iron Molders' Union was represented by Joseph F. Valentine, president *pro tem.;* M. P. Murphy, chairman. Executive Board: John Bradley, J. H. O'Neil, John Loder, W. A. Perrine and David Black, editor. In addition to these conferees there were present Trustees Lawrence O'Keefe, Alex. R. Mitchell and George M. Digel.

The conference organized by selecting Joseph F. Valentine to act as chairman.

On behalf of the National Founders' Association Mr. Pessano outlined what, in the opinion of his associates, were bars to the harmonious progress of the two bodies. He urged that there were not enough skilled mechanics to supply the present demands of the foundries, and that therefore the union's restrictions as to the employment of apprentices were ill advised and should be removed. He severely condemned those who sought to limit output, and cited instances of recent occurrence wherein men were said to have been fined and expelled by local unions of the Iron Molders' Union for making jobs in less time than had previously been done. He also dwelt exhaustively upon the subject of differentials in wage rates. There was a decided difference, in his opinion, between the skill of the bench molder and the floor molder, and that disparity should legitimately and equitably be reflected in their wage rates. He referred to the question of the operation of the molding machine, and gave it as his opinion that the chief objection of the foundrymen to the employment of molders as operators was based upon the fear that they would restrict the output of the machine and thus increase the cost of the product. He concluded his argument by making a strong plea for agreement upon the several points he had touched upon, and the formulation of a national wage agreement which would be of general application, and which would enable the two associations to avoid the difficulties and the friction resulting from the negotiation of local agreements, many of which embodied essentially different propositions.

A general discussion followed this statement, the union's representatives taking strongly opposing ground upon several of the propositions. They expressed pleasure that the representatives of the National Founders' Association had determined to classify its membership, and that for the first time it was possible to deal specifically with the jobbing and machinery foundries included in the membership of the National Founders' Association. It was urged that the removal of all restrictions upon the employment of boys in the jobbing and machinery foundries would pave the way for the gravest abuses and would accentuate the present scarcity of mechanics of the highest skill. The union's representatives agreed that the arbitrary limitation of output was wrong in principle and contrary to the best thought in progressive and enlightened trade unionism, but held firmly to their contention that arbitrary exactions on the part of the employer or his foreman were equally worthy of condemnation. It was further contended that to the employer alone the sole right should not be given to determine the system under which work should be made, and attention called to the fact that the piece price and premium systems, by appealing to the cupidity of the individual, had in the past resulted in a very material increase in the burden of the molder without commensurate advantage.

Differentials as between bench and floor molders in jobbing or machinery shops and the proposition that discrimination be made in favor of the smaller communities were declared by the union's representatives to be inequitable, especially the latter proposition, which was not in harmony with the best conceptions of present day competition. The proposition to give countenance to the employment of men upon low grade work in jobbing and machinery foundries was not viewed with favor, as a general proposition, by the conferees of the Iron Molders' Union, who felt that each case should be decided upon its own merits.

Briefly and in a general way this indicates the attitude of the two parties upon the several subjects figuring in the discussion. Each side apparently concurred in the thought that a general form of agreement adaptable as a ground work for all agreements ratified by members of the National Founders' Association and Iron Moulders' Union would be most advantageous and facilitate the adjustment of all differences upon wage rates or conditions. The experiences of former conferences demonstrate very clearly that no form of agreement could be devised whose terms could be made to cover the general foundry industry as it was represented in the membership of the National Founders' Association, and by mutual consent of the parties to the conference it was determined to confine these first efforts to the machinery and jobbing foundries only, leaving it to the future to formulate similar agreements for the other classes of foundries.

In order to place these thoughts upon record, a resolution was introduced by the representatives of the National Founders' Association, which, after being amended by the union's representatives, was adopted in the following form, omitting the preamble:

Resolved, That it is the opinion of this joint conference, representing the Iron Molders' Union of North America and the National Founders' Association, that the time has arrived when in its judgment the purposes of the two bodies will be best promoted by the formulation of a general form of agreement, national in its character, for each class of foundries, and that as far as possible it should cover all the points arising in foundries of the class covered by said agreement, and be subject to such modification in detail as may be necessary to meet the needs and conditions prevailing in the districts into which the membership of the Iron Molders' Union and the National Founders' Association may properly be divided, all such modifications to be of general application in the district for which they have been formulated.

It was generally agreed that it would be inadvisable and perhaps impractical to attempt to designate a definite sum as the basic or standard wage rate for the entire country, the thought being that the territory covered might be subdivided into districts which could equitably be placed upon a common wage basis.

The representatives of the National Founders' Association argued that in order to carry out the general idea suggested in the resolution adopted it would be necessary to come to an understanding as to the differentials which would be mutually recognized. They proposed that there be a differential between bench and floor molders in jobbing and machinery shops, and one between large cities and other points in the same district. They also contended that cognizance should be taken of the low grade work which was found in every foundry and provision made whereby it could be made by a cheaper grade of labor.

A very lengthy discussion took place upon the subject of differentials, the union's representatives, as has been said, taking strongly opposing grounds to their recognition in the class of foundries under immediate discussion. It became manifest that there was a lack of necessary data to enable the conferees to determine definitely how a proposition such as that presented by the association's representatives would work out, and as there was little immediate prospect of harmonizing the conflicting views as expressed, the effort had to be temporarily abandoned.

Following the programme outlined in their opening remarks, the representatives of the National Founders' Association presented two resolutions, the first relating to restriction of output and the second to apprentices.

In discussing the first of these resolutions the union's representatives again expressed themselves as being opposed to all attempts at unfair or arbitrary limitation of output on the part of their local unions or members. No action was taken on the resolution.

Reverting to the discussion of the resolution bearing upon the ratio of apprentices, the representatives of the union took the ground that the best interests of both parties would be conserved by mutual recognition of an equitable ratio of apprentices, but without the recognition of a satisfactory apprentice ratio they felt they could not agree to the subject matter of the resolution itself.

The representatives of the union asked the attention of the conference to the subject of the nine-hour work day in the following resolution:

Resolved, That on and after January 1, 1903, the members of the National Founders' Association will recognize nine hours of labor as constituting a day's work for their molders; and that in those localities where ten hours of labor is recognized as a day's work the reduction of one hour shall be accomplished without reduction in pay—that is to say, that the molders will receive for nine hours' labor the same wages as they formerly received for ten hours; and further

Resolved, That out of consideration for this concession upon the part of the members of the National Founders' Association, the members of the Iron Molders' Union will co-operate with their employers in using all improved facilities or methods introduced with a view to reducing the labor cost, to the best advantage.

The association's representatives took the ground that until we could come to an understanding upon the terms of a general form of agreement covering the question of differentials and other essential points it would be futile to discuss the nine-hour proposition. They intimated that they had a proposition to offer, affecting the hours of labor, but it was contingent upon agreement upon the points already discussed, and until such agreement was reached they must decline to consider the subject.

The representatives of the union strongly objected to the nine-hour day being made the subject of barter. It should be discussed upon its merits alone and had no relation whatever to differentials in wage rates or apprentice ratios. A reduction in the hours of labor was a logical result of the developments in the industries, and foundry workers, than whom there was none that worked harder, were justified in demanding a shorter work day. Further than to agree that any local demand for a nine-hour day would be given unprejudiced consideration, the representatives of the National Founders' Association would go no further in the discussion of the shorter work day as a national issue.

The union's representatives then introduced the resolution affecting the New York agreement, which had been presented at the New York conference last April, and upon which it was now expected the representatives of the association would be prepared to render a decision. It reads as follows:

Inasmuch as there has been some misunderstanding on the part of the members of the National Founders' Association and the Iron Molders' Union of North America, affecting both the obligations assumed by each party under the terms of the New York agreement and the status which shall be maintained pending the application of the policy therein outlined, the following explanatory clauses shall be considered hereafter as part of said agreement, to govern the actions of the members of the parties thereto in their future relations:

1. The New York agreement provides as follows: "That in the event of a dispute arising between members of the respective organizations, a reasonable effort shall be made by the parties directly at interest to effect a satisfactory adjustment of the difficulty." The words "reasonable effort," herein appearing, contemplate negotiation upon the subject in dispute between the employer directly interested and the molders in his employ, or their representative or representatives, who shall make a serious effort to effect an adjustment. That failing, however, the member of the National Founders' Association involved in the dispute shall properly receive and treat with the president of the Iron Molders' Union of North America or his duly authorized representative with a view to making a further effort at adjustment before reference under the New York agreement.

2. When any change, whether of wage rate, shop practice or conditions, or any other change affecting the relations or the interests of the members of the parties to the New York agreement is proposed by one of the parties thereto, to which objection or protest is raised by the other party, it is understood and agreed that the status originally existing—that is, the status precedent to the proposed change—shall not be disturbed by either party pending reference and decision as provided in the New York agreement.

To the great disappointment of the union's representatives the foundrymen declined to give an expression upon this resolution on the ground that the future relationship of the two associations was so intimately related to the formulation of a general agreement that no good results could be expected from discussions of such matters as those embodied in the resolutions presented until an understanding had been reached.

As the representatives of the union could not agree to the propositions of the other side affecting differentiations of wage rates and were not disposed at this time to submit a counter proposition along similar lines, it was apparent that no further progress could be made by the conference, but as there was evidently a disposition to get together upon the subject of a uniform agreement, a motion finally prevailed to adjourn the conference to such date, early in January, 1903, as might be agreed upon by the presidents of the two associations.

New Plant of Hicks Locomotive & Car Works.

The great demand for railway equipment, especially rolling stock, has not only compelled the builders throughout the country to enlarge their facilities, but also the companies whose shops are devoted to the rebuilding and repairing of locomotives and cars. Among the more conspicuous of the latter are the Hicks Locomotive & Car Works, located at Chicago Heights, Ill., whose business is almost exclusively the rebuilding and repairing of heavy modern locomotives and cars. The company began operations some five years ago in a very modest way with a small output, which has been increased from time to time and is now about 15 locomotives, 15 coaches and 200 freight cars. It is possible to handle as many as 30 engines at one time.

To the original frame building where the business was first inaugurated and which is now used for a mill and freight repair shop, additions have been erected from time to time which have resulted in a very pretentious group of brick and steel buildings being constructed. These consist of a machine shop, 70 x 225 feet, two stories; erecting shop, 170 feet square; boiler shop, 60 x 225 feet; blacksmith shop, 60 x 140 feet; coach shop, 170 x 200 feet; mill, 80 x 140 feet; freight repair shop, 60 x 160 feet; power house, 40 x 80 feet; dry kiln, 20 x 80 feet; upholstering department, 50 x 60 feet, and tin shop, 50 x 100 feet.

The shops are lighted by electricity, equipped with modern tools and labor saving devices throughout, and when completed will be operated by independent motors of the Crocker-Wheeler make. The erecting side of the machine shop is laid out in sections of two tracks, each track being capable of accommodating four 10-ton cranes with 32 foot span and 150 foot travel. These cranes were designed and are being constructed by the company at their own shops. They will be electrically driven. The boiler equipment consists of four 150 horse-power horizontal tubular boilers of their own make; a Hawley down-draft furnace, Sturtevant blower and accessories of the Crane Company's make. The engine room is equipped with an Ingersoll-Sergeant type A compound air compressor of 100 horse-power capacity, a Worthington duplex pump, an Aurora feed water heater and two Ball 200 horse-power compound noncondensing engines, belted to Bullock electric generators of 75 kw. each.

Worcester Manufacturing News.

WORCESTER, MASS., November 17, 1902.—An advertisement recently appeared in New York and Boston newspapers asking for applications for locations for a great manufacturing enterprise to employ 7000 hands, and with capital amounting to $12,000,000 behind it. Answers to the advertisement were to be addressed to a certain box in the Worcester post office. The correspondent of *The Iron Age* has investigated the matter and has learned something concerning it.

A promoter, who says he hails from Pittsburgh, has been looking over the ground in Central Massachusetts, with the purpose, he has stated, of establishing a giant industry here. The company is not organized. It will be an entirely new one. It will manufacture all sorts of iron and steel goods, the promoter says. Asked why he selected an inland location in New England for the site of a steel plant proper, which is a part of the enterprise, he has said it was because of the skilled labor which Worcester would give to such a plant, because of the presence of the Washburn & Moen Department of the American Steel & Wire Company. A number of Worcester men have looked into the proposition, and have not made up their minds that it is a feasible one. Yet it is possible that something will come out of it, although no one expects that a $12,000,000 corporation, employing 7000 men, will be started in a day or a year or even in half a score of years. It may be added that no especially new iron or steel product is promised by this promoter.

The Washburn & Moen Department of the American Steel & Wire Company gave out some interesting figures of wages in the course of the recent campaign for Congress in this district, to show the difference at this big works between the hard times of 1893 and the present day. The figures show fully as well the progress which this great wire plant has made in the few years since the Washburn & Moen Mfg. Company sold out to the consolidation. Here is the table of wages during a number of years, showing the average number of men employed, average total pay roll for four weeks, average wages paid per man for four weeks and the average weekly wages per man:

Year.	Average number of men.	Average four weeks' pay roll.	Average wages per man four weeks.	Average wages per man one week.
1885.....	2,729	$96,912.27	$35.50	$8.87
1890.....	3,646	148,005.00	40.59	10.15
1893.....	2,865	95,194.10	33.22	8.30
1895.....	3,645	140,395.80	38.50	9.63
1900.....	5,460	281,705.50	51.60	12.90
1902.....	5,656	289,828.92	51.23	12.80

The American Steel & Wire Company took possession of the Washburn & Moen property in 1898. Much of the gain between 1895 and 1900, as shown in the table, came after the change in management began, although it may hardly be called a change in manfacturing management, because Philip W. Moen remained in charge of the specialties manufactured by these works, as well as of specialties of the eastern division of the company's business. The other manufacturing heads of the works continued the same. But the fact remains that partly because of the greatly improved general conditions of business, and partly because of the change in ownership, the payroll was doubled between 1895 and 1900, and is still larger in 1902.

The Worcester branch of the Ames Plow Company is having a little strike among its molders, 24 of whom went out on strike. They demanded an advance of 15 cents a day and were refused, the company holding that their wages were ample. Four of the men have gone back to work, and are escorted to and from the foundry by policemen. One arrest of a striker has followed intimidation of the working molders. It is said that of the strikers only six understand the English language. The local union had previously overlooked this foundry, and the discovery being made that the union scale of wages was not paid by the Ames Plow Company the union instigated the strike. It is understood that the strikers' places will be filled with little difficulty.

The electric wire department of the Washburn & Moen Works is turning out an order of about 400 tons for the St. Louis Exposition. The order includes all sizes and kinds of wire for electric purposes, from heavy cables and feed wires to the finer sizes of insulated wire. It is understood that the entire contract for the wire for the exposition will be filled by the Worcester plant.

The Worcester Emery Wheel Company have incorporated under the laws of Maine with an authorized capital stock of $50,000. The officers are: President, T. E. P. Rockwell; vice-president, James C. Coffey; treasurer, John W. McKoan; manager, J. H. Dawson; directors, those officers and William J. Delahanty, Joseph H. Kelley and John F. McGourty. The company have taken space in one of the Merrifield buildings.

The Colonial Box & Lumber Company are losing some of the concerns which were taken in under the original plan. Williams & Bridges of Worcester, among the largest in New England, are now out of the company, and so are several smaller firms in Central Massachusetts. The Colonial Company were incorporated to control the wooden box production of New England, but at the present time most of the larger makers are not included. Litigation has started in this county in which various concerns included in the general plan, but not including Williams & Bridges, have been attached to protect various interested parties.

The machine tool business of Worcester continues to be very good, indeed. All the large shops are rushed to full capacity. The orders are mostly from jobbers who seem to be buying at the advanced prices without serious complaint. Some orders direct from users of tools are received, of course, but inquiry at the offices of the larger companies makes it certain that the bulk of the buying is by jobbers.

The Morgan Motor Company have their first 10-ton auto truck in operation, and the huge machine has attracted much attention. It is claimed for it that it is the largest machine of the kind in existence, its capacity being 2½ tons greater than the largest size made by the Thornycrofts of England. The machine has a number of improvements, including cranes for loading and unloading, and a system of interchangeable loading platforms, the purpose being to have stations where the truck can back into a slip in a platform and leave its own loading platform, and then take another loading platform from another slip, and so on, thus causing less time of idleness of the machine.

The National Emery Wheel Company of Waltham are looking for a new location, and negotiations are in progress for a site at Jamesville.

The Norton Emery Wheel Company are about to put into use a new chimney, which is the second largest in Worcester, the largest being one recently erected by the Washburn & Moen Department at their North works. The Norton stack is 140 feet high and 30 feet square at the base. The Alphonse Custodis Chimney Construction Company of Vienna, who have an office in New York, erected the chimney. The Norton Emery Wheel Company are trying the experiment of burning crude oil in one of their kilns, in which emery wheels are baked. It is expected that the necessary great heat can be obtained by means of this fuel, and if it is the company will likely adopt the system permanently, although the experiment was made because of the scarcity of coal.

S. S. Caskey, who for a number of years has been the superintendent of mechanical construction with the Harlan & Hollingsworth Company, has accepted a position with the F. F. Slocomb Company of Wilmington, Del. Mr. Caskey is a recognized expert in pneumatic engineering, and is the inventor of a number of well-known appliances in this line, among the number being the Caskey portable pneumatic punch, and the Caskey pneumatic riveter, both of which are manufactured, with all latest improvements, by the Slocomb Company.

Martin Welsh, superintendent of Hall Furnace of the Republic Iron & Steel Company, Sharon, Pa., has resigned and has been appointed assistant manager of the new blast furnace of Pickands, Mather & Co., at Toledo. Robert Coates has been made superintendent of the Hall Furnace.

MANUFACTURING.

Iron and Steel.

The Portland Iron & Steel Company, Portland, Maine, have not as yet awarded contracts for rebuilding their plant which was destroyed by fire a short time ago.

The Portsmouth Pressed Steel Company have started up their plant at Portsmouth, Ohio, and will manufacture the Pritchard car replacer. This is a machine designed by W. H. Pritchard for the purpose of replacing cars on the rails that have left the track.

Two of the six mills in the new sheet plant of the Empire Iron & Steel Company, Niles, Ohio, have been started. The plant when completed will contain six hot mills, two cold mills and one three-high 24-inch bar mill. The plant will roll sheets from 16 to 30 gauge and the output will also include small angles up to 4 x 4 inch. They will add a galvanizing department after the first of the year.

Leesport Furnace, Leesport, Pa., which has been out of blast since last summer, has been blown in and is now running nicely on foundry iron. The capacity is about 400 tons per week.

The American Bridge Company are rushing work as fast as possible on their new plant at Ambridge, near Pittsburgh, and expect to begin the manufacture of heavy eye bars next month. Detailed accounts of this plant have previously appeared in these columns.

Reports are that the Cambria Steel Company, Johnstown, Pa., contemplate the erection of two more blast furnaces and will also build 960 Otto-Hoffman by-product coke ovens.

For some months the American Tin Plate Company have had under construction at the Monongahela Works, South Side, Pittsburgh, some new machinery, designed to materially lessen the cost of rolling black plate. It is understood that this new equipment is almost finished an dtests of the new process will be made in a short time.

The Schonthal Iron & Steel Company, Cumberland, Md., are enlarging the capacity of their plant.

The New Process Mfg. Company of St. Louis, Mo., announce a change in the title of their firm name to the New Process Steel & Wire Company, with an increase in their capital stock to $250,000. W. B. Mahon acts as vice-president and general manager, and M. E. Keough as secretary and treasurer. The company have recently taken possession of new buildings in East St. Louis, Ill., and will hereafter conduct all business from that point. Wire nails, barb wire and bale ties will continue to be some of the products manufactured by this company and iron roofing will be manufactured and handled largely.

The new furnace which Joseph Wharton of Philadelphia is building at Phillipsburg on the site of the old Andover Furnace, is expected to go into blast next March. The stack will be 18 x 85 feet and will have a daily capacity of about 200 tons. It will not be at all similar to Mr. Wharton's No. 2 furnace now running at Wharton, N. J., formerly called Port Oram, and No. 3, now building there, which is expected to blow in next June. Nos. 2 and 3 are 21 x 100 feet and are in every respect of the highest type. The normal daily product of the furnaces at Wharton is, No. 1, 150 tons; No. 2, 400 to 450 tons; No. 3, 400 to 450 tons.

The creditors of the Ohio Rolling Mill Company of Findlay, Ohio, are interesting local capital and expect to sell $25,000 worth of stock with which it is proposed to improve the plant and place it in operation again.

General Machinery.

E. Horton & Son Company, Windsor Locks, Conn., are preparing to erect an addition to their plant, which will more than double the present capacity. The company devote their entire attention to the manufacture of the Horton chucks and are constantly shipping them to all parts of the world.

Hubler Bros. & Fesler, Chanute, Kan., machinists, will erect a new machine shop, 32 x 60 feet.

It is possible that the Keystone Driller Company of Beaver Falls, Pa., whose plant was recently destroyed by fire, may remove from Beaver Falls and erect a new plant at some other place.

Tate, Jones & Company, Incorporated, engineers and contractors, Empire Building, Pittsburgh, have added a furnace building department to their business and are in position to design and contract for the building of all kinds of heating furnaces for melting, annealing and tempering, to be heated with oil, gas, coal or coke. Special designs of plate and rod heating furnaces have been made to be adapted to the use of any fuel. The company will also manufacture portable rivet forges and have a newly designed reversing brass melting furnace using fuel oil. They do an extensive business in hoisting, elevating and conveying machinery for all purposes. A modern plant for the manufacture of the various equipment used in their engineering work was recently completed at Leetsdale, Pa.

The George A. Hogg Iron & Steel Foundry Company of Pittsburgh, manufacturers of engines and rolling mill machinery, have lately secured a contract to furnish the Taunton-New Bedford Copper Company of Taunton, Mass., a very heavy reversing plate mill for rolling large copper sheets. The mill will have rolls 30 inches in diameter and 116 inches long, and will be equipped with live tables on both sides. The order also includes reversing engines for same.

Foote Brothers, Nunda, N. Y., manufacturers of concrete mixing machines and gas and gasoline engines, advise us that they will shortly require some new machinery for their plant, which they are enlarging to three times its present capacity. They intend to put out 100 mixing machines this season and will have 20 ready for delivery by March 1. They are sold through the W. H. Wilcox Company of Binghamton.

The Bay State Tap & Die Company, Taunton, Mass., find their present plant too small for their business and are to build a new factory at Mansfield, which they expect to occupy by February 1. The new factory, we are advised, will be equipped with the latest special tools for the manufacture of taps and dies.

Schumacher & Boye, manufacturers of engine lathes at Buck street and Queen City avenue, Cincinnati, Ohio, have found it absolutely necessary to increase their already extensive capacity by the purchase of 180 x 200 feet of ground on Spring Grove avenue, running back to Buck street, in close proximity to their present location, upon which will at once be commenced the erection of a brick structure of two or three stories covering the entire ground space and in which will be installed the general offices of the company. The remaining space will be used for manufacturing and warehouse purposes.

The machinery equipment of the Escanaba Iron Works, Escanaba, Mich., has been shipped to Centralia, Wash., where a new plant will be operated. Mr. Symons, the proprietor, leaves Escanaba in a few days to reside permanently at Centralia.

Harber Bros. Company of Bloomington, Ill., manufacturers of farm machinery, have recently acquired a tract of land, 80 x 200 feet, adjoining their present warehouse and office building, on which it is the intention of constructing a seven-story warehouse. The building will contain every modern convenience and will be strong enough to carry the heaviest loads. Work will probably not commence on the new building until early in the spring of next year. This additional floor space is required to handle the company's rapidly growing business.

The Berlin Machine Works, Beloit, Wis., have secured a contract to equip eight plants of the Kirby Lumber Company of Texas with planing mill machinery. The mills are located at the following places: Mobile, Kirbyville, Woodville, Hookswitch, Buna, Menard, Silsby and Call, Texas. This order is one of the largest single orders ever placed for such machinery.

The Sunderland-Crombie Company, formerly the Omaha Roofing & Supply Company of Omaha, have increased their capital stock to $50,000, all paid up, and have purchased the entire plant, including equipment, of the Davis & Cowgill Iron Works. The works will be improved and additions made to facilitate the handling of the largest and heaviest work. The machine shop and manufacturing plant will be conducted in connection with the mechanical supply and machinery business, with general offices and salesroom at 1208 Farnam street, the works being at 1501-3-5 Jackson street. With the new equipment the company are prepared to furnish from stock engines, boilers, steam pumps and power and transmission machinery.

The Cushman Chuck Company, Hartford, Conn., manufacturers of lathe and drill chucks, have moved their offices and shipping department from the factory on Cushman street to 189 Allyn street, where they occupy a large store and basement, having 5000 feet of floor space. This move was made to obtain more room for manufacturing, as their factory has been overcrowded for some time. The removal of the departments above referred to will give them much additional shop room, which will be immediately available, but it is planned later to add extensively to their factory building.

The Rochester Machine Screw Company, Rochester, N. Y., returned to their restored factory on October 1. The disastrous fire which befell it on January 28 last occasioned a rebuilding above the basement, and it has been done after the manner called "slow burning construction." The company are now fully settled and running their usual capacity.

The Chicago Pneumatic Tool Company report a very large increase in sales during the past few weeks and all of their factories are working night and day in an endeavor to fill the constant flood of orders pouring in. Especially is this the case in their air compressor department and the compressor factory at Franklin, Pa., is being pushed to its utmost capacity. J. W. Duntley, president, is still continuing his business trip on the continent, and his route is announced by the cables continually being received by the Chicago office containing large orders for pneumatic tools, annealing machines, rivet forges, &c. His return is not definitely announced although he will in all probability leave Europe in the very near future.

The new machine shops of the Lake Shore & Michigan Southern Railway at Collinwood, Ohio, have been placed in operation and about 400 men are employed. The foundations for five more large buildings have been put in, but work is being delayed owing to the nondelivery of structural steel. In all, 32 buildings are to be erected by the company at that point, and it will take two years to complete the work. The shops will be among the largest of the kind in the country.

The Brown Hoisting Machine Company, the Cleveland Twist

Drill Company, Variety Iron Works Company, the Bishop & Babcock Company, and several other Cleveland concerns occupying adjacent factory buildings in the leading manufacturing district of that city, have adopted a community of interest plan for fire protection. Water mains have been laid connecting all these plants and water can be pumped by the power plants of all or any of them.

Charles H. Besly & Co., 10-12 North Canal street, Chicago, Ill., report their general business very good. They would call particular attention to their large and varied assortment of seamless brass and copper tubing. Their new store building on Clinton street is progressing rapidly and will give them over double the space of their present five-story building, 10-12 North Canal street. Their 300-page catalogue will be mailed free on application.

The Northern Engineering Works, crane builders, Detroit, Mich., have begun the construction of a 65-foot addition to their crane erecting shop, extending it to a length of 200 x 70 feet wide. The building will be of steel and brick with a slate roof. The addition will be served by a Northern 3-motor 20-ton electric traveling crane. The company report a steadily increasing demand for their electric cranes and electric trolley hoists. They will furnish the electric cranes for the new works of the Standard Engineering Company, at Ellwood City, Pa.

Foundries.

The Wilmington Malleable Iron Company of Wilmington, Del., have purchased 45 acres of land in the southern part of the city from the Lobdell Car Wheel Company, on which a new plant will be erected. It is claimed by those who are interested that when completed the new plant will be one of the largest malleable iron works in the United States. The company intend to erect about 5000 lineal feet of buildings on the site.

The Michigan Foundry Company, Limited, Kalamazoo, Mich., have recently been organized to manufacture iron and brass castings. The working force at present is 14 men, but will soon be increased to 30. The company do contract work only and report that they have all that is possible for them to turn out at the present time. The stockholders of the company are George Polasky, chairman; G. J. Bremer, vice-chairman; F. G. Bremer, secretary and treasurer.

On account of greatly increased business Jewett & Co., Buffalo, N. Y., manufacturers of stoves and ranges, have decided to build a much larger plant. They have therefore sold the property on which the works are located, retaining a lease on it until they can erect their new plant.

The Altoona Foundry & Machine Company, Altoona, Pa., manufacturers of malleable and gray iron castings, will install a new cupola, drill press, lathe and shaper. At a recent meeting of the stockholders the capital stock was increased from $35,000 to $100,000. The company have been very successful since their organization early in the year and are at present crowded with orders.

The Mason Heater Company, Bellaire, Ohio, manufacturers of the Mason All Cast Combination heater, are erecting a new foundry, but have been delayed in getting it started by reason of scarcity of material. They have plans for another building, 100 x 110 feet, which, however, they will not commence until some time next year. They are having a very large demand for their combination heater and an increase in facilities for turning out these heaters has become imperative.

The S. Obermayer Company, Cincinnati, Ohio, Chicago, Ill., and Pittsburgh, Pa., manufacturers of foundry facings and supplies, state that an excellent export trade is being done by them at the present time, they having received several large orders from the following points, viz.: Hamburg, Venezuela, Valparaiso and a number of others from different points in Mexico. These, with the continuous large domestic demand for their product, crowd their productive capacity to the utmost.

At a meeting of the stockholders of the Standard Malleable Iron Company, Muskegon Heights, Muskegon, Mich., the following directors were re-elected: E. L. Howe, Thomas Hume, W. H. Mann, J. H. Belt, and H. J. Sherwood, Cleveland, Ohio.

John E. Thropp & Sons' Company, Trenton, N. J., builders of machinery, engines and boilers, have purchased the Phœnix Iron Works and are converting the entire plant into a foundry which will be ready for operation about December 1. The company will then have a capacity of from 15 to 18 tons of castings per day. The present foundry is being changed into a machine and erecting shop.

A cupola fan and cupola elveator are required by the Krupp Foundry Company, Limited, Lansdale, Pa., for their proposed new plant. The company have purchased a plot of ground and a building in which a machine shop was conducted by Souder & Cliffton. This building will be enlarged by an addition 40 x 60 feet, and used for foundry purposes. A new foundry building 60 x 100 feet will also be erected. They expect to occupy their new quarters in January. The officers are Eli C. Krupp, manager; Henry L. Freed, secretary and treasurer, and F. H. Souder, chairman.

Boilers, Engines, &c.

W. F. Frailey, Superintendent of Water Works Department, Lancaster, Pa., advises us that as soon as the specifications are drawn, which will be in the very near future, the Council will be in the market for a 12,000,000-gallon pump and a stand pipe. A loan of $145,000 has been voted for the improvements.

The Medina Electric Light, Power & Heating Company have been incorporated to build a power and lighting plant at Medina, Ohio. Incorporators: O. P. Van Swèringen, M. J. Van Sweringen, J. G. Boyd, S. C. Stewart and A. J. Watt. Capital stock, $50,000.

The National Steam Pump Company of Upper Sandusky, Ohio, have been organized with $100,000 capital stock with the following officers: L. C. Cole, Bowling Green, president; A. V. Bauman, Fremont, vice-president; R. J. Main, Swayze, Ind., treasurer; T. D. Cole, secretary and J. M. Main, general manager. The company are the successors of the Marion, Ind., Steam Pump Company, who recently removed to Upper Sandusky.

The Erie City Iron Works, Erie, Pa., manufacturers of engines and boilers, will build an addition to their stack shop, doubling its capacity. They have just completed additions to their plant costing about $380,000.

The Board of Control of Cleveland has authorized the Water Works Department to close a contract with the Babcock & Wilcox Company for the installation at the new Kirtland street pumping station for a battery of six 250 horse-power boilers equipped with steel superheaters, and automatic stokers. The boilers will cost $43,454. The bid of the Aultman & Taylor Machine Company of $37,495 was rejected because the firm were unable to supply anything but cast iron superheaters.

The Kennedy Valve Mfg. Company, New York, have just completed an order for the Boston Navy Yard for a large lot of valves and upward of 100 of their underwriters' improved weather proof adjustable indicator posts, for automatic sprinkler system. These posts are everything their name implies, are the very newest and best thing in their line, and were thoroughly approved by the Government engineer in charge.

Bridges and Buildings.

The Joliet Bridge & Iron Company, Joliet, Ill., report that they have in course of construction structural work for the Post Office building at Helena, Mont., aggregating about 225 tons; a building for the Economy Light & Power Company, Joliet, 175 tons; a building for the Sehring Brewing Company at Joliet, about 350 tons; roof and structural work for the American Steel & Wire Company at their Joliet and Waukegan plants of about 75 tons. The company also have under contract, not yet manufactured, three buildings for the Farwell Portland Cement Company, Farwell, Mich., 88 x 134 feet, 70 x 136 feet, and 50 x 134 feet respectively, involving about 350 tons; a five-story building for the Elgin National Watch Company, Elgin, Ill., 50 x 426 feet, about 500 tons; the Joliet Public Library building, which will require about 250 tons; a power house 110 x 150 feet for the Los Angeles Traction Company, Los Angeles, Cal.; a building for the Johnston & Jennings Foundry Company, Chicago, the dimensions of which are 90 x 162 feet, and the structural work for the Chicago Telephone Company's building at Joliet, Ill. In addition to these, the company have about 1000 tons of bridge work in Illinois, Michigan, Minnesota, Wisconsin, Arkansas, Missouri and Oklahoma, which will keep them busy for several months running full force.

Henry L. Norton, Springfield, Mass., is erecting a structural shop, 40 x 100 feet, part of which is already in operation. Mr. Norton will devote his entire attention to the construction of bridges, 43 of which he has contracts for.

Fires.

As a result of their recent fire the Edgar Zinc Company, Cherryvale, Kan., sustained a loss of only $20,000, which is fully covered by insurance. The furnaces were but slightly damaged and were only out five days.

The large packing plant of Armour & Co., at Sioux City Ia., covering 3½ acres, was destroyed by fire November 16. The loss is estimated at $900,000. It is stated that the plant will be rebuilt at once.

The factory building at 286-296 Graham street, Brooklyn, N. Y., which was occupied by a number of manufacturing concerns, was gutted by fire November 16. Lewis P. Weis, manufacturer of machines, who occupied the ground floor, and the Parks Machine Company, who occupied the fourth floor, suffered a considerable loss. The total loss on machinery and stock is placed at $55,000.

The plants of the Michigan Cereal Company and the Povyer Printing Machine Company, St. Louis, Mo., were damaged by fire November 15. The loss is $60,000, about equally divided between the two companies.

Carr Brothers' iron foundry, Grafton, W. Va., was destroyed by fire last week. The loss is about $5000.

The Hudnut Hominy Mills, at St. Joseph, Mo., were destroyed by fire November 12. The loss is about $100,000.

The Central City Foundry, Huntington, W. Va., was destroyed by fire last week, entailing a loss of $15,000.

The buildings of mine No. 8, belonging to the Parker County Coal Company, at Rosedale, Ind., were dstroyed by fire November 14. The loss is about $50,000.

Hardware.

The N. P. Bowsher Company, South Bend, Ind., manufacturers of Bowsher's combination feed mills, Globe sweep feed grinder and machinery specialties, are making an addition to their fitting and grinding room.

Glascock Bros. Mfg. Company, Muncie, Ind., had a fire in their baby jumper department on the 14th ult., which has seriously interfered with their holiday business. They have remodeled the damaged building, adding a brick addition, which doubles the capacity of this department of their business.

Miscellaneous.

The La Belle Iron Works, Steubenville, Ohio, have bought the Boyle-Huston and Covert coal properties, containing 425 acres, located near Brownsville, Pa. The consideration is said to have been about $275,000. The La Belle Iron Works will develop this property at once and have placed contracts for the building of about 200 coke ovens.

The Sharon & Limestone Company, one of the constituent interests of the Sharon Steel Company, Sharon, Pa., have increased their capital from $200,000 to $300,000 for the purpose of making improvements at their mines and quarries.

The Warren Sheet Metal Company have been organized at Warren, Ohio, with a capital of $50,000. The company will erect a large stamping plant for the manufacture of coal hods, galvanized wire pails, wash tubs and other sheet metal goods.

The Gorman Furnace & Mfg. Company of Pittsburgh have received a charter and will engage in the manufacture of furnaces and metal stamped goods.

The Standard Steel Car Company, at Butler, Pa., whose plant for the manufacture of steel cars was recently completed, are making some large additions to their works. The main erecting shop is being increased from 1700 to 2000 feet in length. It is expected that by December 10 they will be turning out 50 steel cars per day. They recently received an order from the Erie Railroad for 1000 steel gondola cars.

Albert Herbst & Co., Philadelphia, Pa., manufacturers of worsted yarns, will erect a machine shop, 26 x 32 feet, and two additional stories, 54 x 154 feet, to the present building. They advise us that they are thinking of installing one more boiler.

The Baltimore Copper Smelting & Rolling Company, Baltimore, Md., have completed arrangements for abandoning their old works at Canton, and are transferring the machinery to their new works adjoining, where they have better facilities for the prompt and economical handling of goods. Shipping will be facilitated by abundant wharfage and by cranes and all latest appliances. Contracts for machinery have been placed.

The business of Copeland & Mitchell, San Angelo, Texas, whose plant was destroyed by fire last August, is to be resumed by Findlater & Copeland, just organized by John Findlater, Jr., and J. R. Copeland. The new firm have purchased a site in the center of the city where they will erect a plant 50 x 100 feet, and equip it with a complete line of blacksmithing, carriage repairing and woodworking machinery. Later they intend to add a machine shop and foundry.

The W. J. Brewer Engineering Company, Room 37, Atlantic Building, Washington, D. C., will shortly be reorganized with a capital of $1,000,000. The company have a good demand for their patent self-contained roller bearings and have received a number of indorsements from prominent concerns. W. J. Brewer is president.

The Victor Safe & Lock Company, Cincinnati, Ohio, have purchased a large lot adjoining their plant upon which they will erect a five-story addition. The new buildings are expected to be ready for occupancy by February 1, and when completed will increase the capacity to over 100 safes daily. The improvements will cost about $60,000.

At a meeting of the stockholders of the Orient Coal & Coke Company, recently organized at Pittsburgh, officers were elected as follows: Julian Kennedy, president, Pittsburgh; J. L. Jackson, vice-president, of Rogers, Brown & Co.; C. J. Morse, secretary and general manager, Youngstown; Reed Kennedy, treasurer. These with Robert Bentley and H. M. Robinson, Youngstown, and H. M. Hooker, of Rogers, Brown & Co., constitute the Board of Directors. The capital stock will be $2,000,000. A tract of 2000 acres in Redstone township, Fayette County, Pa., will be at once developed and 500 ovens built. Access will be had by way of the Pittsburgh & Lake Erie and Pennsylvania roads, both of which will build through to reach this and adjoining fields.

Arrangements have recently been effected whereby the entire output of the Henney Buggy Company's plant will be distributed by the Moline Plow Company of Moline, Ill. The output of the buggy company's plant is about 10,000 jobs annually.

Lorentz & Evarts and Edwin W. Putnam, pattern makers, Hartford, Conn., have consolidated under the name of the Hartford Pattern & Model Company. The company have a modernly equipped plant at 14 Hicks street.

The Peerless Motor Car Company of Cleveland, Ohio, have incorporated with $300,000 capital stock under the laws of West Virginia, and will do business in Cleveland, succeeding the Peerless Mfg. Company, who for some time have been manufacturing gasoline automobiles and parts. The company will enlarge their plant in Cleveland.

The Advance Thresher Company, Battle Creek, Mich., are making extensive improvements to their plant which will greatly increase their capacity. The first heat in the new foundry was run November 8. The operation of the heavy ladles is facilitated by the use of compressed air; the power is electrical. A heating plant and boiler shop will also be constructed. The aggregate cost of improvements will be upward of $500,000, and when in full operation the plant will give employment to 1000 men. The company report the receipt of many orders and have recently made a shipment of over 20 cars of machinery to the Argentine Republic where the implements will be in service at the next harvest in January and February.

The Enamel Steel Tile Company of Bellaire, Ohio, now have their large plant fully equipped and will start up in all the departments the present week. The company are now in a position to submit samples and quote prices on their high grade enamel steel tile, for ceilings, side walls, mantles, hearths, &c.

The Osceola Fire & Silica Brick Company, located at Osceola, Pa., are rushing their new fire brick works to completion, and when finished they will be the finest and most extensive in Clearfield County. The works will have an output of at least 25,000,000 brick per year. The company are composed of good, substantial business men. H. L. Sholly, superintendent of the Tyrone Iron Company, Tyrone, Pa., is interested.

The American Can Company have commenced work on an addition to their plant at Toledo. The new building will be three stories high and will have a floor space of 30,000 square feet, giving them about 80,000 square feet in their Toledo plant. The addition will be completed January 1 and the offices of the company will be removed to a section of the new building to be fitted up for the purpose. The number of men employed will be increased to 600.

Vice-President Cavnah of the Structural Steel Car Company, Canton, Ohio, has sent notice to stockholders and creditors notifying them that negotiations for interesting new Eastern capital have about been closed and asking the creditors not to interfere until the negotiations can be settled successfully. It is stated that every creditor will be paid in full, and that the capacity of the plant will be increased.

The Monarch Stove & Mfg. Company's division of the American Stove Company will remove their plant from Mansfield, Ohio, to Cleveland, where the Monarch line of stoves will be manufactured by the Standard Lighting Company's division of the parent company. Mr. Emmett C. Baxter, who has been in charge of the Monarch division will remove from Mansfield to Cleveland and will continue in charge of the production of this well-known line of stoves.

The Water Works Department of Cleveland, Ohio, are preparing to advertise for proposals on 15,000 ⅝-inch water meters. Some months ago that city closed a contract for 10,000 meters.

The *personnel* of the Sandusky Automobile Mfg. Company, Sandusky, Ohio, has been changed by the resignation of R. S. Thomas as president and J. J. Jackson, director. J. J. Hinde has been elected president, E. J. Cable, vice-president, and C. H. Ely, treasurer. The new stockholders have subscribed $10,000 and steps will be taken at once to erect buildings which have been planned for. The company will manufacture gasoline automobiles.

The American Shipbuilding Company, Cleveland, have received an order from the Western Transit Company for a 400-foot steamer which will probably be built at the South Chicago yards. The dimensions of the craft have not been given out, but it is stated she will be of steel and a modern package freighter in every particular. The recent contract increases the number of orders on the company's books to 34. Deliveries of material for the new vessels are being made with reasonable promptness and it is believed that the company will now be able to get out all their contracts at the times agreed upon.

The W. R. Oyler Automatic Gas Valve Company, recently incorporated by Akron, Ohio, people, are preparing to establish a plant in that city for the manufacture of an automatic safety gas valve made of a material which requires no oil and which will not corrode.

The National Founders' Association.

DETROIT, MICH., November 19, 1902.—(*By Telegraph.*)—The sixth annual meeting of the National Founders' Association convened at the Hotel Cadillac about 11 a.m. this morning, President W. D. Sargent in the chair. The reading of the minutes and the roll call were dispensed with. A committee of three on order of business, and a committee of two to audit the books of the treasurer, were appointed by the president. The reports of the president, commissioner and treasurer were read and approved, after which the convention adjourned until 2 p.m. There are upward of 200 delegates present.

The Iron and Metal Trades.

The fuel question dominates the entire Iron and Steel trade. Instead of the supply improving the inadequacy of deliveries appears to become more aggravated. The West reports many furnaces continually banked for the lack of Coke, which interferes with the production of Pig Iron, and also checks the output of Steel. Eastern works are not only affected by the short supply of Coke, but are also greatly hampered by difficulty in securing Coal. The seat of the trouble continues as heretofore in the lack of transportation facilities. The prospect for improvement in this direction is not brightening, as winter is approaching, when bad weather may be expected to cause increasing difficulty among transportation lines.

The largest Iron and Steel manufacturers anticipate a considerable restriction of output for winter, owing to the causes above given. The only apprehension they express regarding the outlook is that they may not be able to get out sufficient tonnage to satisfy the requirements of their customers.

The charge made in some quarters that discrimination is exercised by the managers of railroad lines in favor of the United States Steel Corporation is refuted by the fact that the furnaces and mills of that corporation are likewise suffering from difficulty in securing supplies of fuel. Some of the most important furnaces of the corporation have been banked on this account part of the past week.

Numerous contracts for furnace Coke are reported at $4 per ton at the oven to run through the whole of the coming year. This shows emphatically how the Coke situation is regarded by furnacemen who would not make such contracts if they felt that an improvement was likely to occur in a few weeks.

A sharply increased demand for Pig Iron is observed in the Eastern market. This is due to the fact that many consumers had supposed that the settlement of the anthracite miners' strike would result in a speedy increase of Pig Iron production; consequently for a time the Eastern demand for Pig Iron was decidedly light. Now, however, it is found that deliveries are as slow as ever on old contracts and some of the largest consumers are in pressing need of a supply of Pig Iron. They will be unable to secure any considerable quantity from either Eastern or Western furnaces and it is expected that a large increase in importations will result. Among the purchases for import during the week was one of 5000 tons of Low Phosphorus Pig Iron at Baltimore.

The demand for foreign Steel is not large, but some sales are reported, among them being one of 4000 tons of Canadian Billets. The price on Canadian Billets is about $28.50, ex-ship New York, which is obtained by reason of very prompt delivery. German Billets are being offered at $26.50 to $27, and some small orders have been entered for importation, but large consumers do not seem to be attracted by the low figures.

Pittsburgh reports larger transactions in both Bessemer and Open Hearth Billets, buyers now taking hold for deliveries over an extended period. Prices at Pittsburgh are firm at a level slightly below the delivered price on foreign Steel in that district.

An interesting occurrence the past week was the starting of the new Rail mill of the Tennessee Coal, Iron & Railroad Company, at Ensley, Ala. The mill was started on the 13th and will for some time make Rails for the company's own use. They are prepared, however, to take orders for delivery early in the coming year.

The heavy inquiries for Rails noted last week not only continue, but appear to be increasing, showing that many railroad companies need more Rails for their next year's requirements.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one month and one year previous.

	Nov.19, 1902.	Nov.12, 1902.	Oct.22, 1902.	Nov.20, 1901.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	*$23.50	*$23.00	*$22.00	$15.50
Foundry Pig No. 2, Southern, Cincinnati	*22.25	*22.75	*22.25	14.25
Foundry Pig No. 2, Local, Chicago	*23.00	*23.00	*23.00	15.00
Bessemer Pig, Pittsburgh	*22.00	*21.50	*21.75	16.00
Gray Forge, Pittsburgh	*21.00	*21.50	*20.50	14.50
Lake Superior Charcoal, Chicago	*26.00	*26.00	*26.00	17.00
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh	*28.00*	28.50	29.50	27.00
Steel Billets, Philadelphia	†26.50	†27.50	†28.00	29.00
Steel Billets, Chicago	†29.00	†29.00	Nom.	....
Wire Rods, Pittsburgh	35.50	35.50	36.00	35.50
Steel Rails, Heavy, Eastern Mill.	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	*18.75*	18.75	19.00	14.00
O. Steel Rails, Philadelphia	*21.00*	21.00	21.50	17.25
O. Iron Rails, Chicago	*24.50*	24.50	25.00	21.50
O. Iron Rails, Philadelphia	*24.00*	24.00	24.50	21.50
O. Car Wheels, Chicago	24.00	24.00	Nom.	15.00
O. Car Wheels, Philadelphia	20.00	21.00	19.00	16.00
Heavy Steel Scrap, Pittsburgh	21.00	21.00	....	....
Heavy Steel Scrap, Chicago	18.50	18.50	18.50	13.50
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	*1.85*	1.85	1.92	1.62½
Common Iron Bars, Chicago	*1.75*	1.80	1.80	1.65
Common Iron Bars, Pittsburgh	*1.70*	1.80	1.80	1.55
Steel Bars, Tidewater	1.75	1.72	1.75	1.70
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.50
Tank Plates, Tidewater	2.10	2.10	2.10	1.75
Tank Plates, Pittsburgh	*1.75*	1.85	1.90	1.60
Beams, Tidewater	*2.00*	2.00	2.10	1.75
Beams, Pittsburgh	*2.00*	2.10	2.10	1.60
Angles, Tidewater	*2.00*	2.00	2.10	1.75
Angles, Pittsburgh	2.00	2.00	2.00	1.60
Skelp, Grooved Iron, Pittsburgh	*1.92½*	1.95	1.97½	1.80
Skelp, Sheared Iron, Pittsburgh	*2.05*	2.05	2.10	1.85
Sheets, No. 27, Pittsburgh	2.65	2.65	2.65	3.00
Barb Wire, f.o.b. Pittsburgh	2.45	2.45	2.50	2.90
Wire Nails, f.o.b. Pittsburgh	1.85	1.85	1.90	2.15
Cut Nails, Mill	2.05	2.05	2.05	2.05
METALS:				
Copper, New York	*11.40*	11.50	12.00	16.85
Spelter, St. Louis	5.05	5.15	5.25	4.12½
Lead, New York	4.10	4.10	4.10	4.37½
Lead, St. Louis	*3.97½*	4.00	4.00	4.25
Tin, New York	*25.12½*	26.20	26.25	27.00
Antimony, Hallett, New York	7.25	7.25	7.75	8.37½
Nickel, New York	40.00	40.00	40.00	60.00
Tin Plate, Domestic, Bessemer, 100 lbs., New York	3.79	3.79	4.19	4.19

* For 1903. † Foreign.

Chicago.

FISHER BUILDING, November 19, 1902.—(*By Telegraph.*)

One of the most important developments of the week is the easier feeling that has developed in Pig Iron for spot or November and December delivery, which is practically the same thing now. The high prices which have been prevailing have attracted all sorts and kinds of Iron from sections which do not usually supply this market, including foreign Iron. The revision of prices, too, has been necessary to adjust with the prices prevailing for the next year's delivery. The result is a more settled market at the close, although prices were very irregular, ranging from 50c. to $1 a ton on the same grade early in the week. Another interesting fact, so far as Pig Iron is concerned, at least, is the demand for a considerable tonnage of Mill grades apparently designed to take the place of Scrap, which is scarce and high. The recent revision in the prices of Merchant Pipe, Sheets, Wire, Nails, Fencing, &c., has been followed by a much more healthful tone, the only unsatisfactory spot in the market at present being in Bars, Hoops and Bands. Mills are able to take care of a considerable additional tonnage, but contracts are not available. The weakness and irregularity of Bar Iron are especially notable. Rails, Plates and Structural Material could scarcely be stronger, and the little lull that has occurred in these departments during the past week has been natural, healthful and welcomed by producers if not by consumers. The unsettling factors are the still unsatisfactory outlook for Coke, and, above all, the congested condition of the railroads by a lack of rolling stock, including cars as well as locomotives. One feature which generally escapes notice is the pressure upon manu-

facturers for Bolts, and Bolt stock and other small material is taken by manufacturers of cars, wagons and carriages and agricultural implement manufacturers. Mills on this material are sold up from six to eight weeks, and not a few buyers are hampered from being unable to obtain shipments promptly. It is notable, too, that the harvester and plow manufacturers have come into the market during the past few weeks, specifying very heavily for Steel on contracts previously placed. Probably one of the most active and important of the industries is the machinery manufacturers, who have work ahead for four to six months. Engine builders and car shops, too, are working night and day. The result is that the Steel mills are able to make but little headway owing to the pressure from new business fully compensating for the old contracts filled, leaving the mills fully as far sold ahead.

Pig Iron.—The most interesting feature of the week has been the inquiry for 20,000 tons of Gray Forge Iron for delivery during the first half of 1903. So little of the lower grades of Mill Iron is used in this section ordinarily that the inquiry is of more than usual significance, probably resulting from the scarcity and high prices of Scrap, with the outlook unfavorable for a material change in conditions in the near future. There is also evidence that there is a decided increase in the domestic Iron available for November and December delivery, which has resulted in lower prices being made, thus more nearly harmonizing prices current for the calendar year and for those prevalent for the various quarters of 1903. Furnaces in the South are said to be working much more satisfactorily and are making better shipments, but their efforts are being somewhat counteracted by the unsatisfactory transportation facilities. The lack of cars and locomotives embarrasses producers and consumers alike. There are one or two other inquiries of moment in the market, one coming from machinery manufacturers and another from manufacturers of Wire Rods. The difficulty recently experienced in otbaining foreign Billets has turned the attention of such manufacturers to the necessity of manufacturing their own Billets, and looking to this end inquiries are now in the market for several thousand tons of Iron for conversion. The demand for spot Iron is less urgent because direct deliveries are better, but a few buyers, whose wants have been much larger than anticipated, have been compelled to cover, and while the majority of large consumers have covered their wants for the first quarter, if not the first half, of next year, there are a few buyers still compelled to make purchases. While the market has still been irregular the tendency has been toward a more settled condition and as near as can be determined prices, based upon No. 2 Southern Foundry, are as follows: $22 at the furnace for November and December delivery, $21 for the first quarter of 1903, $20 for the second quarter or first half, $18.50 to $19 for the third quarter, and $18 to $18.50 for the last quarter of 1903. While there have been sales for the third and fourth quarters the general disposition of consumers is to await developments. Early last week there were freer offerings of Valley Iron at prices ranging from $24.85 to $25 for November and December delivery and some sales were made on this basis, although higher prices have been asked during the last few days. Silvery Iron seems to have been less prominent in the sales of the week and prices have varied but little from those previously quoted, ranging from $29.15 to $32.15 for 4 to 8 per cent. Silicon for quick delivery. The lack of Coke still keeps many local furnaces idle and prices for local Iron for immediate delivery are little better than nominal, and for the next six months' shipment there has been little change in quotations. It is notable that all sorts of Iron are finding a market in this section, including foreign Iron, Virginia Iron and various grades and kinds which usually seek markets in other sections. Charcoal Iron has continued very strong and scarce at full prices. As far as quantities are concerned sales have ranged all the way from carload lots to 1200-ton lots, but the aggregate tonnage placed has not been large. The prices current for the first six months of 1903 are as follows:

Lake Superior Charcoal	$26.00 to $27.00
Local Coke Foundry, No. 1	23.50 to 24.00
Local Coke Foundry, No. 2	23.00 to 23.50
Local Coke Foundry, No. 3	22.50 to 23.00
Local Scotch, No. 1	24.00 to 24.50
Ohio Strong Softeners, No. 1	27.50 to 28 00
Southern Silvery, according to Silicon.	27.15 to 30.15
Southern Coke, No. 1	.... to 24.65
Southern Coke, No. 2	.... to 24.15
Southern Coke, No. 3	.... to 23.65
Southern Coke, No. 1 Soft	24.15 to 24.65
Southern Coke, No. 2 Soft	23.65 to 24.15
Foundry Forge	22.15 to 22.65
Southern Gray Forge	21.65 to 22.15
Southern Mottled	21.65 to 22.15
Southern Charcoal Softeners, according to Silicon	27.15 to 27.65
Alabama and Georgia Car Wheel	29.15 to 29.65
Malleable Bessemer	24.00 to 24.50
Standard Bessemer	23.00 to 23.50
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon	28.00 to 30.00

Bars.—The market for Bar Iron has been unsettled, prices ranging all the way from 1.70c. to 1.85c., but the bulk of the sales have been at from 1.75c. to 1.80c., the two extremes being exceptional. Even single car lots are selling at between 1.77½c. and 1.80c. Specifying on old contracts has not improved materially, and new business has not developed satisfactorily. There has been some improvement in the specifying on contracts for Soft Steel Bars, but the mills are in need of new orders. Hoops and Bands are also quiet, there being few orders of moment in the market. The following are the prices current: Soft Steel Bars, 1.75c. to 1.80c.; Hoops, 2.15c. to 2.25c.; Angles, 1.85c. to 1.90c., base, mill shipment. The demand from store has been only moderate, but prices have not changed essentially, Bar Iron selling at 2.15c.; Soft Steel Bars, 2c. to 2.25c.; Angles at 2.50c., and Hoops at 2.40c. to 2.50c., base, from store.

Structural Material.—The market has been quiet, buyers realizing that it is useless to make inquiries from the mills for appreciable quantities for prompt delivery, but there have again been a few orders taken for next year's delivery, although the aggregate tonnage has been relatively small. Buildings of considrable magnitude are still being projected for next year, but the difficulty in obtaining material is somewhat discouraging. There is some little inquiry for foreign material, but only in small amounts, and prices are nominal. For domestic Steel, mill shipment, the following are the prices current: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 2c. to 2.25c. The inside prices, which are official, are little better than nominal, being current only for indefinite deliveries, the outside prices representing more nearly the market, the premium over the official prices being paid for the assurance of definite shipment. There has been less demand for quick shipment from local stocks, but the market has remained steady. The following are the prices current: Beams and Channels, 2.50c. to 3c.; Angles, 2.50c. to 3c., and Tees at 2.55c. to 3.50c. at local yards.

Plates.—The capacity of the mills is almost entirely taken up for eight months, only small quantities being accepted as filling in orders. The following are the prices current: Tank Steel, ¼-inch and heavier, 1.75c. to 2.10c.; Flange, 1.85c. to 2.10c.; Marine, 1.95c. to 2.20c. There has been a moderate movement from local yards, and prices have remained stationary as follows: Tank Steel, ¼-inch and heavier, 2.25c. to 2.50c.; Tank Steel, No. 8, 2.35c. to 2.55c.; Flange, 2.50c. to 2.65c., all f.o.b. warehouse, Chicago.

Sheets.—The market has continued quiet and unsatisfactory, keen competition still resulting in irregular prices. The following are the prices current for Black Sheets, mill shipment, carload lots, f.o.b. Chicago: No. 20, 2.55c. to 2.60c.; Nos. 22 and 24, 2.60c. to 2.70c.; No. 26, 2.70c. to 2.80c.; No. 27, 2.80c. to 2.90c.; No. 28, 2.90c. to 3c. For small lots from store the usual advances are charged. In some cases Galvanized is being sold at base price subject to 75 and 10 per cent. discount, but the following are the net prices: No. 27, 3.25c. to 3.50c. for mill shipment, and small lots from store at 3.40c. to 3.65c., Chicago.

Cast Pipe.—There has been a moderate current order demand for small sizes, but otherwise the market has been quiet and prices are nominally unchanged. Manufacturers continue to sell small lots as follows: 4-inch, $37; 6-inch, $36; 8-inch and upward, $35; Gas Pipe, $1 per ton higher, f.o.b. Chicago.

Billets.—Trade has mainly been confined to single cars and jobbing lots, for which a premium over quotations is asked. There is some inquiry for round lots, but if any business has resulted it has not come to the surface. Lower prices have been current on the Atlantic seaboard and in the Pittsburgh district, but at the close higher prices are asked. Domestic Open Hearth Forging Billets continue to range from $35 to $40, according to buyer, analysis and time of delivery, but Rerolling Billets are not salable over $31 to $32, and foreign Billets are nominally quoted at $29 to $30, delivered, Chicago.

Merchant Pipe.—The lower prices which had been anticipated were announced by the National Tube Company last week and went into effect November 12. Competition is said to still be very keen and there are various rumors that contracts are being made for delivery beginning in January, 1903, but these reports have not been verified in this market and probably originated before the decline took place. The following are the current basis discounts, net, random lengths, for mill shipment, f.o.b. Chicago, carloads only:

	Steel Pipe.		Guaranteed Wrought Iron.	
	Black. Per cent.	Galvd. Per cent.	Black. Per cent.	Galvd. Per cent.
⅛ to ⅜ inch	66⅔	56⅔	63½	53½
½ inch	68⅔	58⅔	65½	55½
¾ to 6 inches	73⅔	63⅔	70½	60½
7 to 12 inches	71½	61½	68½	58½

Orders for less than carloads are charged at 12½ per cent. advance. Extra and double extra strong, cut lengths, lower random discounts by 10 per cent. net for 6 feet and longer and 15 per cent. net for 3 to 6 feet.

Boiler Tubes.—There has been a moderate demand and a barely steady market, prices being subject to an additional discount of 5 per cent. from the schedule for mill shipment, which is as follows:

	Steel.	Iron.
1 to 1½ inches	43½	38
1¾ to 2½ inches	56	36
2¾ to 5 inches	61	46
6 inches and larger	56	36

There has been a moderate movement from store and prices have remained unchanged at the following schedule of discounts:

1 to 1½ inches	35	35
1¾ to 2½ inches	47½	32½
2¾ to 5 inches	55	42½
6 inches and larger	47½	..

Merchant Steel.—The market has continued very quiet as far as new business is concerned, but this is rather gratifying to the mills than otherwise, they being so far sold ahead and there being so much difficulty in making shipments, accumulations being reported at the various mills. There has been more specifying on contracts by agricultural manufacturers and a fair order trade for Crucible Steel. Prices are as follows for mill shipment: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.95c. to 2.10c.; Open Hearth Spring Steel, 2.65c. to 2.75c.; Toe Calk, 2.25c. to 2.40c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 47 off in carload lots and 42 off in less than car lots. Ordinary grades of Crucible Tool Steel are quoted at 6c. to 7c. for mill shipment; specials, 12c. upward.

Rails and Track Supplies.—There has been an increased inquiry for Heavy Rails for next year's delivery, resulting in the sale of about 20,000 tons for delivery during December, 1903, otherwise the market has been quiet. Official prices for domestic Rails continue firm at $28 for standard and $27 for second quality, mill shipment. The active demand for Splice Bars, Spikes, Bolts and Nuts has continued and the market has remained strong. The following are the prices current: Splice Bars or Angle Bars, 2c.; Spikes, 2.50c.; Track Bolts, with Hexagon Nuts, 3.10c. to 3.45c.; Square Nuts, 2.95c. to 3.10c.

Old Material.—There has been but little change in the market, the offerings being only moderate, and, although buyers are disposed to hold off, prices are well sustained. Old Car Wheels continue very scarce and are wanted at full prices. Relaying Rails are in good demand and difficult to obtain. The following are the prices current per gross ton, Chicago:

Old Iron Rails	.... to $24.50
Old Steel Rails, mixed lengths	$18.75 to 19.00
Old Steel Rails, long lengths	23.50 to 24.50
Heavy Relaying Rails	32.00 to 32.50
Old Car Wheels	24.00 to 25.00
Heavy Melting Steel Scrap	18.50 to 18.75
Mixed Steel	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates	$22.00 to $22.50
Iron Car Axles	24.50 to 25.00
Steel Car Axles	23.50 to 24.00
No. 1 Railroad Wrought	21.00 to 21.50
No. 2 Railroad Wrought	18.50 to 19.00
Shafting	20.00 to 21.00
No. 1 Dealers' Forge	.... to 17.00
No. 1 Busheling and Wrought Pipe	15.00 to 15.50
Iron Axle Turnings	.... to 15.00
Soft Steel Axle Turnings	14.50 to 14.75
Machine Shop Turnings	14.00 to 14.50
Cast Borings	10.25 to 10.75
Mixed Borings, &c	10.50 to 11.50
No. 1 Boilers, cut	14.50 to 15.00
Heavy Cast Scrap	17.00 to 17.50
Stove Plate and Light Cast Scrap	13.50 to 14.00
Railroad Malleable	16.25 to 16.75
Agricultural Malleable	16.00 to 16.25

Metals.—The Copper market has continued slow and easy, Lake being quoted at 11½c. in carload lots and 11¾c. to 12c. in a jobbing way. Pig Lead has been steady with a continued good demand at 4.05c. in 50-ton lots, 4.07½c. in carload lots and 4.10c. in a jobbing way. Sheet Zinc has been quiet and steady at 6½c. in carload lots and 6.65c. in lots of 600 pounds. Old Metals have continued quiet without essential change in prices. The following are the prices current: Heavy Cut Copper, 10½c.; Red Brass, 10½c.; Copper Bottom, 9½c.; Lead Pipe, 3.90c.; Zinc, 3.90c.

Coke.—The offerings of Foundry Coke has been only moderate and the market has continued firm at prices ranging from $10.50 to $11.50 per ton on track, Chicago; for the first half of 1903, $4.50 to $5 for Foundry and $4 to $4.50 for Furnace Coke at the ovens is quoted.

In line with the concentration policy of the United States Steel Corporation, the Board of Directors of the American Bridge Company of New York was reduced from 11 to 5 members at a meeting of stockholders November 13. The new directors are: Elbert H. Gary, Joshua A. Hatfield, Alfred J. Major, Thomas Murray, Henry Schoonmaker. The board re-elected the former officers.

Philadelphia.

FORREST BUILDING, November 18, 1902.

The peculiar conditions which have been so prominent in the Iron trade during the past several months continue in full force. The lapse of time, which was expected to result in adjustments, has so far utterly failed to accomplish anything of that kind, and at this writing the complications are greater than ever. Not only that, but the prospects for a restoration of normal conditions are exceedingly indefinite, so that new engagements are difficult to arrange. Prices of Pig Iron are totally out of proportions with the more advanced products, yet there is no immediate probability of their being brought into harmony in the near future. In point of fact there is a general dislocation which bids fair to continue all through the winter months. This is the more disappointing as no interests are benefited, while all are more or less injured. It is no satisfaction to furnace owners to see prices at the highest figures quoted within the past 20 years if they are not able to take advantage of it, nor is it any help to them to feel assured that high prices will continue through the winter months, if they have nothing to deliver, except material that will cost dollars per ton more than it ought to cost, to say nothing of back orders which must be delivered at much lower figures than to-day's prices. This is surely a case of burning the candle at both ends, but how is it to be avoided? Coke and Coal cannot be had unless at double or more than double the prices which were estimated in the original cost sheets of 1902 Pig Iron, yet consumers are now confronted with higher prices for next year's Coke than they have ever paid, and the requirement is a binding agreement for all next year, or no Coke at any price. Furnace owners are asking themselves, What shall we do about it? Coke cannot be bought for three months or a half year, it must be the whole year or nothing. Some would pay a good stiff price for the first half of the year, but to be tied to a full year at a high price is considered too arbitrary. Nevertheless, a reasonable price would be paid for year Coke, but an advance of a hundred per cent. or more, and for a year, that is liable to serious reaction, requires more than the usual allotment of nerve. At the moment, therefore, Coke and Coal is a burning question in more ways than one.

The matter of the cost of Pig Iron would be less serious if other products could be adjusted in proportion, but they are persistently working at cross purposes. Prices of Finished Material are totally unresponsive to high priced raw materials, but if the mountain cannot be induced to go to Mahomet, Mahomet must go to the mountain, although he may take his time in doing it. All the recent changes in finished products, however, have been to lower figures, and there are no signs of recovery. Moreover, foreign Pig Iron is coming in at considerably less than is quoted for American Iron. Steel Billets at seaboard are within $2 of the Pittsburgh price of Bessemer Pig Iron, hence it is hard to see what basis there is for supposing that high prices can be maintained for any length of time. Temporary conditions may, and probably will, lead to high prices during the winter months, but any attempt to arbitrarily enforce phenomenally high costs of production for a full year to come does not appear to be warranted by the general outlook. As regards the course of the market during the past week, it may be said that prices of Pig Iron have reached the highest level of any period since 1882. Prices bid fair to continue during the winter months, however, but beyond that the best opinions are liable to be very much astray. There are plenty of favorable conditions yet, and not a few that may be the reverse of favorable, but which will finally predominate requires time to determine. The question of fuel, of transportation, of labor, and of finance, are matters of unusual importance, and at the present time cannot be figured out with certainty. All that can be done for the time being is to sail close to the wind, and be prepared for emergencies. It is a good sign that Wall street has passed through a severe strain without appreciable disarrangement to business interests, and encourages the hope that at least another year of prosperous activity will be experienced before there is any general reaction.

Pig Iron.—Prices are strong and working higher. This applies not only to deliveries from now to April, but for any delivery during the coming year. The high price of Coal and Coke will not permit of lower prices for Pig Iron, so that pending further light on the situation furnace owners quote high figures even though it may prevent much business being done. Nevertheless, many of the furnaces are sold a long way ahead, on the basis of $21 to $22.50 for No. 2 X Foundry, figures which at the present time would receive practically no consideration at all. This is rather a serious condition of affairs, as it leaves the American markets wide open to foreign Iron. This is the more dangerous because of the weak condition of foreign markets. Foreigners are keeping a close watch on the American markets and unload large blocks at every favorable opportunity. It is believed that very large blocks have been sold for shipment to points in the interior, while on the seaboard it is fed out

in such quantities as consumers are willing to take from carloads up to 200 and 300 ton lots. Cargo lots are offered at extremely low prices, nominally $19 for Middlesbro, but less would be accepted on firm offers. Ocean freights are also more favorable, and it would be no surprise to see 4 or 5 shillings freights during the winter months, as return cargoes can be secured on very advantageous terms. Local furnaces expect to ship more Iron during the coming month, although supplies of fuel are irregular and uncertain, but furnaces are accumulating stock (of fuel), and have fair prospects for a moderate output of metal in the near future. Prices, however, are at the top notch, with no prospect of reaction, unless there may be too much of a spread between foreign and domestic quotations. Consumers in the New England districts are taking much smaller quantities than usual, as foreign Iron can be delivered at materially lower figures via Boston and New York. These conflicting influences make it a pretty hard market to diagnose, as there are strong features on both sides. The absolute scarcity and high cost of American Iron naturally lead to high prices, while the steady encroachments from abroad are likely to have just the opposite effect. Under such conditions it is hardly probable that the high prices now ruling can continue beyond the next two or three months, while things might occur that would cause a change still sooner. Meanwhile prices for city and nearby deliveries are about as follows for American Iron for any delivery previous to April and foreign spot, or within 30 days:

No. 1 X Foundry	$25.00 to $26.00
No. 2 X Foundry	23.50 to 24.50
No. 2 Plain	22.75 to 23.25
Gray Forge	21.00 to 21.50
Middlesbrough	21.50 to 22.50
Scotch	23.00 to 24.50

The two last mentioned would be 50c. to $1 less alongside vessel. American Iron is about the same prices for spot deliveries or any time up to April.

Billets.—No business of any importance reported recently, although $26.50 to $27.50 could be done for ordinary foreign Steel, or $29.50 to $30.50 for American. Special Steel has been sold in lots of a few hundred tons each at from $31 to $35. Market rather inclined toward weakness.

Plates.—There is rather a shortage of Plates, owing in part to decreased output, mills being unable to get Coal to run more than about half their capacity. There is a good demand, however, and even with a full output it would be readily taken. Prices are firm but unchanged as follows: Small lots, 2.10c. to 2.15c.; carload lots, ¼-inch and thicker, 2c. to 2.05c.; Universals, 2c. to 2.05c.; Flange, 2.10c. to 2.20c.; Fire Box, 2.25c. to 2.30c.; Marine, 2.30c. to 2.35c.; Charcoal Plates, C. H. No. 1, 2½c.; C. H. No. 1 Flange 3c.; C. H. No. 1 Flange Fire Box, 3½c.

Structural Material.—There is plenty of business, but mills appear to be pretty well up with their orders and deliveries are not hard to get except for special sizes. Prices are irregular, ordinary small Angles, 1.75c. to 1.90c., while Beams, Channels, &c., command all the way from 1.80c. to 2.25c. All depends upon the circumstances in each particular case.

Bars.—Business is pretty good in the Bar trade, but prices are much below what they ought to be considering the high cost of material. The supply of Bars is quite liberal, however, as there is a great falling off in the demand for Skelp, which leaves so much more room for Bars. Carload lots can be had at 1.85c. to 1.90c., and Steel Bars at 1.75c. to 1.85c., prices not very strong.

Sheets.—The demand is quite active for moderate sized lots, quick delivery, and there are some inquiries for the first half of the coming year, but bids are at low prices. For December and January shipments prices are a little better, but considering the high cost of raw materials they are not what they ought to be.

Old Material.—The demand is very light, and to effect sales holders have to accept less money. Bids and offers are about as follows for lots delivered in buyer's yards:

Old Steel Rails	$21.00 to $21.50
Heavy Steel Scrap	20.50 to 21.00
Low Phosphorus Scrap	26.50 to 27.50
Old Steel Axles	25.00 to 26.00
Old Iron Rails	24.00 to 25.00
Old Iron Axles	28.00 to 29.00
Old Car Wheels	20.00 to 21.00
Choice Scrap, R. R. No. 1 Wrought	22.00 to 23.00
Country Scrap	20.00 to 21.00
Machinery Cast	19.50 to 20.00
No. 2 Light Scrap	17.00 to 18.00
No. 2 Light (Ordinary)	14.50 to 15.00
Wrought Turnings	16.00 to 16.50
Wrought Turnings, Choice Heavy	17.00 to 17.50
Cast Borings	10.25 to 10.50
Stove Plate	14.00 to 15.00

W. H. Gibbons, president of the Eastern Steel Company, Girard Trust Building, Philadelphia, Pa., writes us that they started up the 12-inch train at their mill at Pottsville November 10, and have been running it continuously on day turn since with satisfactory results. They expect to start the 19-inch train in about two weeks, when they will be able to produce Channels and Beams up to 6 inches and 4 x 4 Angles. They expect to operate through the winter, and as soon as possible next year will get the 23-inch mill in action, which will permit them making up to 20-inch Beams and Channels.

Cleveland.

CLEVELAND, OHIO, November 18, 1902.

Iron Ore.—Market conditions this week indicate the approach of the end of the season of navigation. In many respects this will be a welcome event, as the railroad equipment now used in that trade is badly needed in others. The loss will not be felt by either the Ore shippers or the consumers of that commodity, as the amount brought down the lakes is ample for all purposes and more than sufficient if the present delay in the production of Pig Iron continues. The rates of carriage have remained stable under pressure and it looks very much now as if the year would pass without further alterations. There has been a little talk of making rates and contracts for the movement during the coming year, but this has been merely surface talk and nothing has been done. The proposed basis of rates has been 75c. from the head of the lakes. The going rates at present are as they have been: 80c. from Duluth to Ohio; 70c. from Marquette; 70c. from Escanaba. A few sales of low grade Ore have also been made, but the amount is not large. The prices did not change on these transactions.

Pig Iron.—A number of incidents have made the market very much easier during the past week, but the conditions are not altogether satisfactory to the furnacemen. The inquiries on Monday were very much lighter than they have been for weeks and the furnaces are able to catch up on some of their back orders. This is due in part to the fact that some of the foundries are now closed on account of a strike of the molders and, of course, are not taking their usual proportion of Pig Iron. This is merely a temporary relief, but it is helping out considerably. Those who are looking beyond this quiet period declare that some relief must come soon or there will be suffering in the Iron market. Many furnaces in the Valleys have been banked almost all week and some that had been in operation went out on Saturday night and Sunday. The idle furnaces numbered 20 last week, and the reports Monday were that several had been added to that number with no resumptions. The inevitable and invariable Coke shortage is the announced cause of the difficulty. There has been further comment on the irregularity of Coke shipments and the seeming inconsistency of the railroads and there has been so much severe criticism of the railroad management that some talk of discrimination has been heard. Some of the furnaces for instance have been getting Coke in special train loads almost regularly, while others have been forced to be content with one shipment on Monday of 20 or 30 carloads, at which rate it would take five or six weeks to collect a week's supply. This statement represents the condition in which one furnace has found itself since October 1. The withdrawal of Frick Coke from the merchant trade and the application of that product almost exclusively to the Steel Corporation furnaces may in part account for the irregularity of shipment, but not altogether. The talk of discrimination in favor of the Steel Corporation furnaces is not entirely borne out as some of the railroads charged with that offense have been slighting their own furnaces as well as the merchant furnaces which are making the complaint, and at the same time the furnaces of the Steel Corporation at Youngstown and New Castle have been idle as much as any of the other furnaces of the Valleys. The Coke shortage has now reached the point where it is beginning to be dangerous to the Pig Iron industry and the Steel trade as well. There has been talk of further importations, but one of the larger Pig Iron firms has made inquiry abroad and reports that almost all of the surplus abroad has been sold up and that the market here cannot depend upon that supply. This statement, however, does not seem to accord entirely with the other statement frequently made of late that some of the furnaces abroad have been willing to shade their prices slightly in the interest of increased business for the future. The home furnaces are not in very good condition for delivery during the first half of next year unless the present easy state of the market is more extensive than is generally supposed. The Valley furnaces are offering but little Iron for first half delivery at $23 Valley furnace for No. 2 Foundry. Southern furnaces are willing to take $20, Birmingham, for No. 2, while one furnace, which is not in very good condition for deliveries, offers its output at $18.50, Birmingham. Bessemer and Basic furnaces are far behind with their orders and some mills are actually suspending operations because of the lack of material. Under the circumstances the producers are not quoting prices until they can promise quick delivery.

Finished Iron and Steel.—The market this week has disappointed the Steel makers, who have been demanding large premiums on their material, and it begins to look as if the needs which were supplied by premium material have in part been met. How many enterprises which might have been carried on have been stopped

because the prices have been too high, it would be impossible to state. It seems probable, however, that a great deal of business might have been started had it not been for the excess price policy of some of the smaller mills. The standard mills, which have maintained a stable and conservative price policy, have not been interfered with in the least by the easing up of the market demands, as they appear to have as good business in sight as at any time this year. The plate market is a case in point. The demand on the larger mills has been seemingly as heavy this week as at any time during the past six months, which has, of course, been the heaviest season of the past two years. A lessening of the demand would not be extraordinary, since many of the mills have sold their material for a year ahead and it would be reasonable to suppose that some of the buyers might soon ease up on their orders. The smaller mills, however, have been selling for no longer than a month ahead. They have determined to get the full price warranted by the market on every sale made and therefore have made the sales as close to delivery time as possible. This has accounted for the phenomenon of some mills making deliveries in a week or ten days from the time the orders were placed. There has been a noticeable lessening of the demand for these Plates and it has seemed altogether possible that many of the urgent needs of the market have been met and that no new enterprises are being undertaken which require the contractors to use Plates at the high level of prices recently attained by these mills. The mills have yielded somewhat to the force of the situation by a slight reduction of prices. It is now possible to make purchases of Plates at the mills at 2c., while formerly the price held rigidly at 2.10c. The lessened demand is also felt in the trade out of stock, and while the jobbers are still selling at 2.50c. for Universal Plate, they are taking from 2.25c. upward for Sheared Plate, upon which the demand is not quite so heavy. In Structural Shapes the situation is somewhat easier, both from the larger mills and the smaller mills and jobbers. The jobbers are selling only in small quantities and the sales are not so frequent as heretofore, which may be accounted for by the easing up of building operations during the winter, although severe weather has not set in here as yet. The jobbers are still getting from 2.50c. to 3c. out of stock. The smaller mills have eased up on their prices, the slackening of the demand for Angles being the immediate occasion for this. The field in which the smaller mills have been working seems to have narrowed considerably of late because the urgent needs which were taken care of at premiums have been in a measure met. The prices at the small mills range from 2c. to 2.50c., the lower quotation being on Angles. The larger mills still have some uncovered capacity for the first half of nevt year and their sales have been steadier. Their price has been unalterably 1.60c., Pittsburgh. The demand for Sheets is not quite as robust as it might have been, but this is the off season, and while it may be a little early yet for such practices, it looks as if some of the consumers were beginning to clean up for invoice time, which will be recognized this year to a greater extent than last year, when it was ignored in the rush of business. Sheets are sold now in bundles instead of in carload lots, and the consumers are not anticipating any needs, but are caring only for those which are urgent and immediate. One explanation of this is that the consumers are anticipating a further decrease in the price of material, which has not been heard much of lately. There is, however, a slight downward tendency in the market, which is weak. Sheet prices, however, have not changed in the least and are quoted as follows: No. 27 out of stock, as a basis for all other prices, 3.10c. to 3.25c. for one pass cold rolled, and at the mill in carload lots 2.85c. to 2.95c., while Galvanized Sheets of the same gauge are bringing 3.70c. to 3.85c. at the mills. The Bar Iron situation has eased up a little. The mills, however, are finding a better demand for material because they have been forced into idleness recently through a lack of raw material. The price has not been shaded as much as seemed possible some time ago and the smaller mills are quoting 1.80c., Pittsburgh, which they claim to be upholding rigidly, despite the statement made recently that they have been cutting under that quotation. The larger mills are also upholding the price. On Western sales no difference is usually made in the quotations, whether at Pittsburgh or Youngstown as a base. Steel Bar prices are keeping up, although the demand for the Bessemer product has not been as brisk of late as formerly, probably because the selling of Bessemer Billets has increased within the last few weeks. The quotations still are 1.60c., Pittsburgh, for Bessemer and 1.70c., Pittsburgh, for Open Hearth. The demand for Bessemer Billets is large, with some sales being made, as the supply is greater than it was a short time ago. The selling of Rails has been fair, but the needs for the coming year seem to have been about covered at least as far ahead as October 1. The price for Standard Rails is still $28.

Old Material.—The market shows a downward tendency, with the prices inclined to sag, most of the dealers offering concessions from the present market quotations, which are continued, as follows: No. 1 Wrought, $21, net; Iron Rails, $27.50, gross; Iron Axles, $28, net; Cast Borings, $12, gross; Wrought Turnings, $16:50, gross: Cast Scrap, $19, net; Car Wheels, $19, gross; Heavy Melting Steel, $19, gross; Old Steel Rails, $19, gross.

Birmingham.

BIRMINGHAM, ALA., November 17, 1902.

Stress of circumstances gave us rather a quiet market the past week. The car situation was a dominant factor in affairs. There was no use in buying Iron, for there was no telling when one could ship it. If one offered any he could only promise to ship as soon as he could, and the prospect did not favor promptitude. The situation here has caught the attention of the leading officials and a pretty thorough investigation has been made by them in person. The result is that the same policy has been inaugurated by all the principal roads. That policy is to permit no cars to go outside the district until the jam is relieved. So great is the car famine north of us that our cars are seized as soon as unloaded and appropriated by connecting lines. The only remedy is to keep what is left at home until things get straightened out again. Of course, this interferes with shipments, except to a very limited extent. Retaliation to some extent has prevailed and gondola cars from other lines have been impressed into service and loaded with Iron and shipped out. But nearly all of them get stuck in a jam before reaching destination. A prominent official went to a large shipper and told him that a certain train of Coal cars loaded by him could not be permitted to leave the district. The operator replied that he was under a heavy forfeit for nondelivery and showed his contract. Shipments made long enough ago to have reached their destination, and to have a return of cars, are found by tracers to be side tracked on connecting roads to be moved when they clean up their own house. This statement is made to show buyers that they are not the only ones who have grievances to air.

As to prices it looks as if there was hardly enough done to fix them. But there were some sales; Chilling Charcoal Iron sold at $26, No. 1 Foundry sold at $25 and No. 2 Foundry sold in a small way at $25. There were sales of this grade also at $24, and as low as as $23 prevailed. The other grades are about as reported in the last letter. The truth is that the only thing to be said of the market is that it is a haphazard market. Said a leading official to the writer when approached for market values: "Ther are none. It's just what you ask, and it's a coincidence if two sales are at the same price." For the first half of next year prices are on a basis of $21 to $22 for No. 2 Foundry. That grade sold at both prices. For the last half of 1903 values are on a basis of $20 for No. 2 Foundry, with only a limited business doing. Yet there was a sale of No. 2 Soft for that delivery at $22. There is no disposition on the part of sellers to press business for that delivery. The belief here is prevalent that some large interests have not yet covered their requirements for the last half of 1903, and the expectation is that they will be looking for soft spots by January. They may not find them.

The Car Service Association's report for October shows that it handled 56,231 cars; which is the largest showing for any one month since its organization. For the whole year the number reported was 503,432 cars.

As to Coke there seems to have been some sagging the past week, due, it is thought, to the fact that recent purchases are yet in part supply. Quotations were given at $6 to $6.50, but there were some sales at higher prices. There was an important sale of Coal lands during the week, covering about 5000 acres. The lands are located in St. Clair County, east of us, and near the surveyed line of the Seaboard Air Line, and only a few miles from the Central of Georgia Raod. The purchaser was the latter road. This makes this road the owner of over 9000 acres in that locality, and the inference is that in course of time the railroads will not only haul Coal for others, but they will be in the market as miners and sellers of Coal to the general public.

An important step has been taken by the State concerning the convicts who have heretofore been leased to various corporations, who had absolute control of them during the lease. The State officials now proposed to assume control of the convicts and work them in the mines under the same conditions governing the employment of free labor and deliver the coal mined at an agreed contract price. The operators are to furnish living accommodations and are relieved of all responsibility for their care. The State assumes all that. The present leases expire Junary 1, and there will probably be lively competition for their services, as labor is yet in scant supply. Bidders are restricted to a minimum limit of 200 convicts.

Coal is as hard to get as ever. A prominent operator said to your correspondent he was afraid to take orders and had just refused an order for 100 cars at a tempting price. Others report the same thing. With some operators the loss is serious. But they can do nothing but wait for the clouds to roll by.

The Valley Iron Company are pushing the work on their plant and during the past week contracted for the erection of 300 Coke ovens to cost about $120,000. It is beginning

to leak out that a prominent Iron interest has determined upon the erection of a furnace plant, the primary object being to supply their own needs and make them independent of the general market. Produce all that enters into your business is the popular motto in commercial life now.

The Rail mill at the Steel mill was tried on some Rails the past week and turned out a few. They will for a while make only what they may need themselves, and may not be in the general market for some months. The subject is mentioned to remind your readers that we have a Rail mill.

There are several things brewing, but it is hardly probable that anything definite concerning them will occur now until after the holidays. The prospects seem still to be fine for a continued good business. A great deal of heavy business is nearing completion for Mexico and the West Indies, and is mostly for sugar mills. All the shops report plenty of work on hand and plenty more of it offering. Nearly all of them could use more labor. The scarcity of labor is not confined to any one class or branch. It covers all classes. The weather so far has been altogether in favor of the Iron maker. We may look for a change in this respect from now on, and for a great increase in the lamentations that have become a part of the trade.

The French Iron Market.

PARIS, November 1, 1902.

The strike of the miners in the United States had not yet terminated when our country was also stricken by the same calamity. At the last meeting at Commentry the socialist leaders of the departments of the Nord, the Pas de Calais and of the Loire induced the miners to cease work. Their demands are, 1, a raise in wages, and, 2, to have working days limited to eight hours; also a guaranteed minimum of wages and so forth. There is no doubt that the demands of the workmen are exaggerated, and therefore the Coal mining companies felt that they could not agree to an advance in wages which the present condition of affairs does not warrant. As a result operations have been suspended in all the Coal mines. Manufacturers have naturally turned to Belgium as their principal source of supply for the quantities they need and, of course, have been obliged to pay higher prices. But the poor quality furnished them has obliged them to place their orders in Germany, where the quality of Coal is better and prices are relatively lower. Had it not been for the strike in the United States American Coal would have been in great demand here. At the time the strike began a large number of Iron works were poorly supplied, and if the strike continues most of them will have to shut down. Several works, principally in the departments of Nord and Loire, have discharged part of their men.

Prices of rolled products are in consequence very firm, and an advance in values would be inevitable if it were not for the competition existing between mills. The market here in Paris remains inactive, and the same dullness we have been accustomed to for several months past continues. Quotations are as follows: Coke Iron, 17 francs; No. 1 Iron, 18 francs; No. 2 Sheet Iron, 21 francs; Heavy Rails, 15.50 francs; Rails of 20 kilos, 16.50 francs; Small Rails, 18.50 francs.

Although buyers are well aware that actual prices will not admit of any concessions, their orders are for small quantities only. This sufficiently demonstrates that orders for home supply are not abundant, and if, by chance, an important order comes up for export all the mills compete for it at figures that are simply incredible. It is but lately that the Santa Fé Railroad Company were in the market for 12,000 tons of Light Rails of 20.8 kilos, and bids were submitted by German, Belgian and French firms. In Germany the firm Friederich Krupp of Essen demanded 130 francs, the Bochum Verein for Bergban und Gusstahlfabrikation 125 francs and another firm 117 francs. The Belgian Works of Cockerill, the Société d'Ougrée and the Angleur Steel Works varied in prices from 115 to 120 francs. In our country the Steel Works of Micheville asked 124 francs and De Wendel & Co. 110.50 francs. Naturally the last named firm was declared the successful bidder, but at the price of 110.50 francs, f.o.b. Antwerp or Dunkirk, it is very improbable that they can realize the least profit. This is equal to about $22, and any mill that intends to find remuneration in such low figures must be exceptionally well equipped.

The department of Meurthe and Moselle, the most important industrial center of France, has become more active, as the demand for Pig Iron has notably improved during the past few weeks and prices have even advanced. In the Haute-Marne orders are still scarce, but transactions are not closed below 17 to 17.25 francs, and in some cases even 17.50 for Bar Iron. Puddled Sheet Iron is invoiced at 18.50 to 19 francs; Sheet Steel at 19.50 to 20 francs. In the Ardennes the supply of orders is quite regular.

At the meeting on Monday last at Charleville the Ironmasters decided upon a rise in prices of Iron, because Pig Iron for the last quarter of the year had been advanced and Coal had become scarce. Present quotations for Iron are: 15.75 francs per 100 kilos for large orders and 16 francs for current business.

There is nothing particular to report concerning prices of Bar Iron for the districts of Loire and the Centre, prices remaining firm on the basis of 18 to 18.50 francs per 100 kilos, and it is perfectly useless to count upon concessions of any kind.

In the Nord Iron founders continue to consider the effects of the strike. The difficulty in getting supplies and the advance in the cost of production are the causes of the increasing firmness of the prices of Merchant Iron. The volume of business has not much increased, but current transactions are closed at 15.50 francs for Merchant Iron, 18 francs for Hoop Iron, 17 francs for Sheet Iron, 16.50 francs for Light Rails and 16 francs for Heavy Rails.

St. Louis.

CHEMICAL BUILDING, November 19, 1902.—(*By Telegraph.*)

Pig Iron.—The offerings of spot Iron have been notably larger the past week, and while the major part of this Iron is direct shipments from the furnaces some considerable reselling by consumers in this territory is in evidence. It is said in conservative circles that perhaps 75 to 80 per cent. of the consumers' requirements for the first half of 1903 have been provided for, and while prices as a rule are steady and firm some little Iron is being sold in this market under $20, Birmingham, for No. 2 Foundry. We quote, f.o.b. St. Louis:

Southern, No. 1 Foundry	$24.25 to $27.25
Southern, No. 2 Foundry	23.75 to 26.75
Southern, No. 3 Foundry	23.25 to 26.25
Southern, No. 4 Foundry	22.75 to 25.75
No. 1 Soft	24.25 to 26.25
No. 2 Soft	23.75 to 25.75
Gray Forge	22.75 to 24.75
Southern Car Wheel Iron	.... to ....
Malleable Bessemer	.... to ....
Ohio Silvery, 8 per cent. Silicon	.... to ....
Ohio Strong Softeners, No. 1	.... to ....
Ohio Strong Softeners, No. 2	.... to ....

Bars.—The jobbing trade report a fair demand for Iron and Steel Bars, with a moderate amount of new inquiry to hand. We quote from the mills: Iron Bars at 1.85c. to 1.90c. and Steel Bars at 1.80c. to 1.90c. Jobbers quote Iron Bars at 2.25c. and Steel Bars at 2.25c.

Rails and Track Supplies.—The general features in this department of the market are unchanged, and the volume of inquiry and demand continues heavy. We quote as follows: Splice Bars, 2.10c.; Bolts, with Square Nuts, 3c. to 3.10c.; Hexagon Nuts, 3.25c. to 3.30c., and Spikes, 2.60c. to 2.75c.

Angles and Channels.—The jobbers are handling a very good volume of business in Angles and Channels, with prices ruling on the former basis. For materials of this class 2.50c., base, is asked.

Pig Lead.—The Lead situation is unchanged, and no material increase in the volume of demand and inquiry is indicated. We quote Chemical at 3.97½c. to 4c. and Desilverized at 4c. to 4½c.

Spelter.—Dull conditions have been experienced in the Spelter market the week under review, and prices have sagged off to some extent. The market is considered to be on a strong basis, and this lull in the trade is only temporary. Quotation of 5.05c. to 5.07½c. seems to be a general one at this time.

The Cal Hirsch & Sons Iron & Rail Company have removed their general offices to the Wells Building, Broadway and Olive street, St. Louis, occupying the entire fourth floor. They will continue to conduct their warehouses and branch offices in St. Louis, Mo.; East St. Louis, Ill., and Cincinnati, Ohio, as before.

The Structural Steel being used in the building of the new annex to the Chemical Building, St. Louis, Mo., comes from the works of the Jones & Laughlin Steel Company of Pittsburgh, Pa., for whom the F. A. Goodrich Iron & Steel Company, Bank of Commerce Building, are the St. Louis representatives.

Cincinnati.

FIFTH AND MAIN STS., November 19, 1902.—(*By Telegraph.*)

Beyond a necessary subsidence in the market for spot Pig Iron, owing to the nearness of the new year, there is nothing of consequence in the way of change to report. The situation so far as the buying and selling of Pig Iron is concerned is exceedingly quiet. Endeavor is very largely confined to battling with the distressing problems of deliveries on existing contracts. By many the Coke situation is regarded as easier, though not yet devoid of trouble. The market for spot Southern Iron is settling to the basis of $20, Birmingham, for No. 2 Foundry. That is the minimum on which offers are being made, and the maximum is some-

where near $2.50 higher. These figures, however, apply only to the better grades, for the lower grades are weaker in proportion to the remainder of the list. For the first half of 1903 the minimum basis of $19, Birmingham, for No. 2 Foundry is being offered by several furnaces which had been holding prices 50c. to $1 higher. There is a liberal offering for last half at the minimum basis of $18, Birmingham, for No. 2. There is no great expectation for any radical change in prices within the next week, and the quietness is expected to continue. Freight rate from the Hanging Rock district $1.10, and from Birmingham to Ohio River points $3.25. We quote, f.o.b. Cincinnati, for 1902 delivery, as follows:

Southern Coke, No. 1	$24.25 to $26.00
Southern Coke, No. 2	23.25 to 25.00
Southern Coke, No. 3	22.25 to 24.00
Southern Coke, No. 4	19.00 to 20.00
Southern Coke, No. 1 Soft	24.25 to 26.00
Southern Coke, No. 2 Soft	23.25 to 25.00
Southern Coke, Gray Forge	19.00 to 20.00
Southern Coke, Mottled	19.00 to 20.00
Ohio Silvery, No. 1	30.10 to 32.10
Lake Superior Coke, No. 1	26.60 to 27.10
Lake Superior Coke, No. 2	26.10 to 26.60
Lake Superior Coke, No. 3	25.60 to 26.10

Car Wheel and Malleable Irons.

Standard Southern Car Wheel	$28.25 to $29.25
Lake Superior Car Wheel and Malleable	27.50 to 28.50

Quotations for 1903 shipment, freight rates only guaranteed to March 1, are as follows, f.o.b. Cincinnati:

Southern Coke, No. 1	$22.75 to $24.00
Southern Coke, No. 2	22.25 to 23.25
Southern Coke, No. 3	21.75 to 22.75
Southern Coke, No. 4	21.25 to 22.75
Southern Coke, Gray Forge	21.25 to 22.25
Southern Coke, Mottled	21.25 to 22.25
Southern Coke, No. 1 Soft	22.75 to 24.00
Southern Coke, No. 2 Soft	22.25 to 23.25
Lake Superior Coke, No. 1	26.60 to 27.10
Lake Superior Coke, No. 2	25.60 to 26.10

Old Material.—The market is a little weaker, and quotably lower on some stock. We quote dealers' buying prices, f.o.b. Cincinnati, as follows: No. 1 Wrought Railroad Scrap, $20 per net ton; Cast Scrap, $16.50 to $17 per net ton; Iron Rails, $24.50 to $25, gross; Steel Rails, long, $23.50, gross; same, short, $18, gross; Iron Axles, $26.50, gross; Car Wheels, $21, gross.

Plates and Bars.—The market is quiet, and while nominally unchanged is, nevertheless, a shade weaker. Iron Bars in carload lots, 1.92c., with half extras; same, small lots, 2.20c., full extras; Steel Bars, carload lots, 1.72c., with half extras; same, small lots, 2.20c., full extras. Plates are quoted nominally, ¼-inch, in carloads, 1.70c.; same, 3-16, 1.80c. As a matter of fact, however, mills having Plates to ship are getting 2.15c. without trouble. I-Beams and Channels, 1.70c., base. All prices f.o.b. Cincinnati.

Pittsburgh.

(*By Telegraph.*)

PARK BUILDING, November 19, 1902.

Pig Iron.—The market on Pig Iron is rather quiet as regards sales, furnaces preferring to work on old contracts on which they are much behind on deliveries, rather than take on new tonnage. Most of the business being placed is for small lots for early shipment. Sales of 500 to 1000 ton lots of Bessemer for December and January shipment are being made at prices ranging from $22.50 up to $23.50 and higher at furnace, prices depending largely on the buyer and how soon he wants the Iron. It is not likely that anything definite will be done in regard to further purchases of Iron by the United States Steel Corporation until the furnaces have caught up to some extent on old contracts on Iron for the corporation on which they are considerably behind. Bessemer Iron for delivery over first six months is held at about $21.50 at furnace, but on very large tonnage a little better might be done. We note a sale of 500 tons of prompt Bessemer at $23.25, and another of 300 tons at $23.75, at Valley furnaces. Gray Forge Iron is dull and weak at $21, Pittsburgh. No. 2 Foundry Iron for prompt shipment brings $24 to $25, but for next year's delivery $22.50 to $23 is quoted. There is not much doing in Foundry Iron, consumers being pretty well covered.

Steel.—A better inquiry for Steel is reported, and a leading mill is said to be quoting slightly higher prices. We quote Bessemer Billets at $28 to $28.50 and Open Hearth Billets at $31 to $24, Pittsburgh, depending on carbon and sizes.

Coke.—A number of contracts for strictly Connellsville Furnace Coke have been made at $4 a ton at oven for delivery over all of next year.

(*By Mail.*)

The pessimist who has been predicting freely for some time that the prosperous condition of the Iron trade for the past three or four years was about over and we were due on a siege of depression will hardly have his views borne out by events of the last few days. The principal one of these is the unsolicited advance of 10 per cent. in wages given their thousands of employees by the Pennsylvania Railroad, which was quickly followed by similar action of Pennsylvania lines west of Pittsburgh, the Lake Shore & Michigan Southern and other roads. The men who are at the head of these great railroad systems have a keen perception of actual conditions existing in the business world, and had they not been of the firm belief that present prosperous conditions were bound to continue for a long time this voluntary advance in wages would not have been made. It is a well-known fact that it is a much easier matter to advance wages than to reduce them. This advance in wages by the Pennsylvania systems means an increased outlay of fully $7,000,000 per year, and nothing that has occurred in trade circles for a long time has done so much to restore confidence as this voluntary action on the part of this great railroad corporation. Pittsburgh is now in the midst of the worst freight congestion in her history, and main lines and switches for miles east and west of this city are occupied with thousands of loaded cars awaiting motive power for shipment. The situation is really serious, so much so that A. J. Cassatt, president of the Pennsylvania Railroad, with other officials, came to this city yesterday and will endeavor to adopt radical measures that will relieve to some extent at least this great freight congestion, which is so seriously interfering with business. There was a report that the Pennsylvania Railroad had about decided to refuse to receive any freight for one week, in order to allow the blockade to be lifted. This radical measure will hardly be adopted, but it is certain that the officials of the Pennsylvania Railroad and other lines will devise some means of moving these thousands of cars to relieve the situation. All the railroads have men out urging shippers to unload cars as fast as possible in order that the best service may be obtained from them. The favorable weather of the past month has really been of great benefit, for had winter weather started, with heavy snows, the situation would certainly have been much worse. The closing of lake navigation will require a large number of cars for Coal and Ore traffic, and this will have a tendency to make the matter worse. The enormous grain products will have to be moved and every car and locomotive that can be pressed into service will be used, and no doubt the railroads will do all in their power to handle the enormous tonnage that confronts them. The claim has been made that Pennsylvania and other railroads are two or three years behind the times in not having provided more motive power and cars to move the rapidly growing freight tonnage of the country. While this may be partly true, the fact remains that the tonnage now offering is beyond all precedent and they have simply been caught short handed and are doing the best they can to relieve a bad situation. More terminal facilities and motive power are the chief wants and these will no doubt be provided by the roads as rapidly as possible. The claim that the roads are doing all in their power to relieve the situation and move the tonnage in a reasonable time is borne out by the fact that the Pennsylvania Railroad and other lines have placed enormous orders for cars, locomotives and other equipment, and the Steel car shops, locomotive shops and other works that build railroad equipment are congested with orders and filled up practically for all of next year. Railroad contractors have refused to take on any more work, and such activity in railroad supplies was never known before in the business world. While the winter months will probably show little relief over the present situation, it is expected that by April or May the railroads will have received much of the equipment which is now being built and will be in better position to handle the freight that is being offered them. The Coke situation continues deplorable and one day last week 22 furnaces in the Pittsburgh and Valley districts were banked down, waiting for Coke to arrive. All kinds of means are being resorted to in order to get Coke, and concerns who can spare shifting engines are sending these up into the Connellsville region and bringing down trainloads of Coke to help them out. The Coke operators are performing their part by turning out more Coke than ever before in their history, and if the railroads could furnish motive power to move this Coke the blast furnaces would have no trouble getting fuel as fast as needed. While little relief can be expected in the winter months, it is confidently believed that the worst of the situation will be over by next April. The Iron trade does not show much that is new, conditions remaining practically the same as noted in our last report. It is evident that a good deal of Foreign Pig Iron will be imported into the Pittsburgh and Valley districts in the next three or four months, as domestic furnaces are unable to get out metal as fast as needed. One local Steel concern that bought 50,000 or 60,000 tons of foreign Iron some time since are now getting deliveries on this. Some foreign Foundry Iron is coming into this market and the outlook is that a good deal of Foreign Pig will have to be brought in to keep the Steel works, foundries and other consumers supplied. The Steel market continues quiet and prices are softer. Bessemer Billets are being offered at $28, Pittsburgh, and on a large tonnage for extended delivery a slightly lower price has been made. Open Hearth Billets

command from $31 up to $34, Pittsburgh, prices depending on carbons and specifications of buyers. In Finished Material a heavy tonnage continues to be placed in Plates and Structural Steel, and large Structural concerns advise us that deliveries of Plates are almost impossible to get. A somewhat better buying movement in Sheets is reported and the market is fairly firm. A good tonnage in Pipe is being placed and the market will probably have more stability on account of the recent reduction in prices announced by the leading interest. The general situation on Finished Iron and Steel is more satisfactory than for some time. A number of idle Tin mills of the American Tin Plate Company have been started and others are being made ready to be put in operation. There is nothing to indicate any slump in prices or demand for Finished Iron and Steel, but on the contrary, the outlook is decidedly encouraging.

Muck Bar.—The market continues quiet and prices are not as firm as they have been. Local makes of Muck Bar are being freely offered at $35, delivered Pittsburgh, and we note a sale of 2000 tons at this price. Eastern Muck Bar continues to be offered at $34 or less, delivered.

Ferromanganese.—English Ferro has been offered at $50.50, delivered, in this market without finding buyers. Local consumers are covered well into next year and there is very little doing. We quote English and German Ferro at $50 in large lots and $52.50 in small lots.

Plates.—A heavy tonnage continues to be placed in Plates, but large orders for extended delivery are being taken by the leading mills at the regular price of 1.60c., Pittsburgh. Plates for prompt delivery command from 1.75c. to 1.85c. at mill. Official prices for Plates for extended delivery are as follows: Tank Plate, ¼-inch thick and up to 100 inches in width, 1.60c., at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms net cash in 30 days.

Steel Rails.—Within the past week or two negotiations have been opened with the Rail mills by a number of leading roads for their requirements for next year, and it is probable before January 1 arrives that the Rail mills will be sold up for all of next year. It is not unlikely that Rails will be imported to meet deliveries that may be wanted in the early months of 1903. We quote at $28, at mill, for Standard Sections.

Sheets.—A buying movement in Sheets has developed in the past week and the general feeling is better than for some time. Specifications on contracts are coming in a little better and it is probable quite a number of Sheet mills that have been idle for some time will soon start up. The tone of the market is fairly firm, but it is claimed that occasionally fixed prices of Black and Galvanized Sheets are slightly shaded by some of the outside mills for very desirable orders. We quote Nos. 22 and 24 Black Sheets, box annealed, one pass through cold rolls, at 2.45c.; No. 26, 2.55c.; No. 27, 2.65c., and No. 28, 2.75c. For small lots the usual advances are charged. We quote No. 26 Galvanized Sheets at 3.35c., or 75 and 10 off; No. 27, 3.60c., or 75 and 10 off, and No. 28, 3.85c., or 75 and 10 off. All the above prices are f.o.b. at mill.

Rods.—There is not much demand for Rods, but the tone of the market is fairly strong. We quote domestic Rods at $35.50, and Open Hearth at $37, maker's mill.

Structural Material.—Nothing special has developed during the week aside from the statement of a Pennsylvania railroad official that his line will spend in the next year or two fully $200,000,000 in improvements. If this is correct, it means an enormous tonnage of Structural Steel, much of which will certainly go to local mills. A great deal of bridge work is being placed and tonnage being placed with the mills is heavy. However, mills are making somewhat better deliveries and prompt Beams and Channels do not command quite as high prices as formerly. For prompt delivery 2c. to 2½c. is quoted. Official prices for shipment next year are as follows: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6, 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.60c., half extras, at mill; Universal and Sheared Plates, 1.60c. to 1.85c.

Bars.—Some improvement in demand for Steel Bars is noted, and more tonnage is being placed than for some time. Specifications are coming in a little better. Some weakness has developed in prices of Iron Bars, and we quote these at 1.70c. in carloads and 1.75c. to 1.80c. in small lots, f.o.b. Pittsburgh, half extras, as per National card. We quote Steel Bars at 1.60c., at mill. All specifications for less than 2000 lbs. of a size subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10 per lb. extra. Quantities less than 1000 lbs., 0.30c. per lb. extra, the total weight of a size to determine the extra regardless of length.

Hoops and Bands.—Tonnage is only fair, and the mills could take care of more work if it was to be had.

Spelter.—We quote prime Western for future delivery at 5.28½c., Pittsburgh. Slightly higher prices are asked for prompt delivery.

Merchant Steel.—There is a moderate amount of new business being placed, and the mills are somewhat behind in deliveries, owing to inadequate shipping facilities. Prices are unchanged, and we quote: Tire, 2.15c. to 2.25c.; Spring, 2.25c. to 2.35c.; Toe Calk, 2.30c. to 2.40c., base; Sleigh Shoe, 2.15c. to 2.25c. Differentials are as follows: Less than 2000 lbs. of a size and not less than 1000 lbs., 10c. advance; less than 1000 lbs. of a size, 30c. advance; Cold Rolled Shafting is 47 per cent. off in carloads and 42 per cent. in less than carloads delivered in territory east of the Mississippi and north of the Ohio rivers. Tool Steel is 6½c. to 10c. for ordinary grades and 12c. and upward for special grades.

Boiler Tubes.—Tonnage is heavy, and the tone of the market is firm. Discounts in carloads are as follows:

Iron Boiler Tubes.

1 to 1½ inches and 6 to 13 inches	36½ %
2¼ to 3 inches	45½ %
1¾ to 2½ inches	35½ %

Skelp.—The market is very quiet. We quote Grooved Iron Skelp at 1.92½c. to 1.95c. and Sheared at 2.05c. to 2.10c., Pittsburgh.

Merchant Pipe.—There is no special change to note in the market. A fair amount of tonnage is being placed for this season of the year, and the recent revision in prices by the National Tube Company has given more stability to the market. Pittsburgh basing discounts in carloads are as follows:

Carloads.

	Merchant Steel Pipe.		Wrought Iron.	
	Black.	Galvd.	Black.	Galvd.
	Per cent.	Per cent.	Per cent.	Per cent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inches	75	65	72	62
7 to 12 inches	73	63	70	60

NOTE.—Orders for less than carloads will be charged at 12½ per cent. advance.

Iron and Steel Scrap.—The market continues somewhat quiet, the mills as a rule being pretty well covered on Old Material and refusing to make new contracts until after the first of the year. We quote Heavy Melting Stock at $21 in gross tons; No. 1 Cast Scrap, $19; No. 1 Wrought Iron Scrap, $20.50 in net tons; Cast Iron Borings, $11.50 in gross tons; Old Iron Rails, $25 to $25.50 in gross tons.

Coke.—Output of Coke fell off last week about 10,000 tons, owing to lack of cars and motive power. It is said the present condition of the Coke trade, as regards cars and motive power, is worse than at any time this year. Last week about 20 furnaces in Pittsburgh and the Valleys, and also in the Chicago and Milwaukee districts, were banked for want of Coke. There is not likely to be much improvement in the situation until along in April and May of next year, when some of the motive power now being built for the railroads will have been delivered. Contracts for Connellsville Furnace Coke are being made at $3.75 to $4 a ton and $4.50 to $5 a ton for Foundry.

New York.

NEW YORK, November 19, 1902.

Pig Iron.—The demand for early delivery and for shipment during the first half of next year has sharply improved. This is due to the fact that when the Anthracite miners' strike ended many consumers of Pig Iron believed the situation would speedily be relieved, and that they would be able to secure regular shipments on their contracts. Many of them therefore refrained from making further attempts to purchase Iron, and depended on such stocks as they had and on scanty receipts. They now find that the difficulty in securing Coke is still causing great trouble in the operation of blast furnaces, and they are consequently in need of Iron and must get it from some source. While the demand has been heavy the transactions are reported to have been quite small, as furnace companies are too well sold up, both for the remainder of this year and the first half of next year, to risk taking more business. Buyers are again turning their attention to foreign sources of supply, and it is said that purchases for importation are likely to increase considerably. A purchase of 5000 tons of Low Phosphorus Pig for importation at Baltimore is reported. Prices of domestic Pig Iron continue very irregular, depending, as heretofore, on the necessities of the buyer and the time of delivery. For the first half of 1903 the following quotations are made: Northern Iron, at tidewater, No. 1 X, $23.75 to $24.75; No. 2 X, $22.50 to $22.75; No. 2 Plain, $21.50 to $21.75. Tennessee and Alabama brands, in New York and vicinity: No. 1 Foundry, $24 to $24.50; No. 2 Foundry, $23.50 to $24; No. 3 Foundry, $22 to $22.50.

Steel Rails.—The heavy inquiries reported last week are resulting in sales. An Eastern railroad company closed for 17,000 tons for delivery late next year, and Western mills have made quite a number of sales, aggregating 30,000 tons or more. Small transactions have been fairly numerous. The inquiries are said to be increasing rather than diminishing, showing that there are still a large number of railroad companies who need Rails for next year. We quote $28 at Eastern mills for Standard Sections.

Finished Iron and Steel.—Orders now being entered for bridge work are believed to be nearly if not quite equal to shipments made on contracts. Some important business is under negotiation in this line, which will possibly be closed during the current week. Plate manufacturers report new business quiet, but they regard the situation with indifference. So much difficulty is experienced in operating mills in the East on account of shortage of fuel that Plate manufacturers are constantly in trouble with their customers over failure to make deliveries according to contract. Unless the fuel situation improves, it is stated that the Eastern mills will hardly be able to get out the tonnage they now have booked for delivery the next three months without taking any new business. Structural Shapes are in continued good demand in modern quantities. The supply of Angles has greatly improved, and they can now be obtained at a somewhat lower price than that prevailing for Beams. We quote, at tidewater, as follows, but for small lots and prompt delivery higher prices are being obtained for Structural Material and for Plates: Beams, Channels and Zees, 2c. to 2.25c.; Angles, 2c. to 2.25c.; Tees, 2c. to 2.25c.; Bulb Angles and Deck Beams, 2.10c. to 2.25c. Sheared Steel Plates are 2.10c. for Tank, 2.20c. for Flange, 2.35c. to 2.40c. for Fire Box. Refined Bars are 1.90c. to 2c.; Soft Steel Bars, 1.80c. to 1.90c. Foreign Beams are 1.75c. and Angles 1.80c., ex-ship, New York, in large lots.

Old Material.—The Eastern situation as regards rolling mill and Steel works stock continues unsatisfactory. The Eastern mills of good standing appear to be well supplied with either foreign or domestic Scrap, and are not in the market. The railroad companies also seem to have much more Old Material to offer than had been expected, while stocks are heavier in the hands of other holders. The Western demand for material of this character keeps up quite well, but is not sufficient to prevent some recession in price. The demand for Cast Scrap is excellent, as the foundries are obliged to purchase large quantities to help out shortage in Pig Iron. Selling quotations are as follows, per gross ton, f.o.b. cars in this vicinity:

Old Iron Rails	$22.00 to $22.50
Old Steel Rails, long lengths	21.00 to 22.00
Old Steel Rails, short pieces	18.50 to 19.00
Relaying Rails, heavy sections	29.00 to 30.00
Relaying Rails, lighter sections	33.00 to 35.00
Old Car Wheels	19.50 to 20.00
Old Iron Car Axles	25.50 to 26.00
Old Steel Car Axles	24.00 to 25.00
Heavy Melting Steel Scrap	18.50 to 19.00
No. 1 Railroad Wrought Scrap Iron	20.50 to 21.00
Track Scrap	18.50 to 19.00
Busheling Scrap	14.50 to 15.00
No. 1 Machinery Cast Scrap	19.00 to 20.00
Stove Plate	13.00 to 14.00
Wrought Turnings, delivered at mill	16.00 to 16.50
Cast Borings, delivered at mill	9.50 to 10.00

Metal Market.

NEW YORK, November 19, 1902.

Pig Tin.—Under the leadership of London the market suffered a sharp decline and the spot quotation, which has been held artificially high by American interests, was razed to a more normal position relative to the ruling quotation on futures. Business was on a slight scale and there is now absolutely no faith pinned to present future quotations by consumers. Yesterday the cutting of spot set in with force, when it was hammered down to 25.40c. To-day the work continued at a great rate and spot sold at 25.15c. The ruling quotations at the close to-day were as follows: Spot, 25.12½c. to 25.17½c.; November, 25c. to 25.15c.; December, 24½c. to 24.65c.; January, 24.40c. to 24.60c. London closed to-day, £113 for spot and £112 5s. futures. In this market spot suffered to the extent of 1.07½c., as compared with last week. In the downward rush futures also suffered and show a decline of just .50c. as compared with last week's figures. The London decline amounted to £3 for the week on spot, and futures fared almost as badly, with £2 5s. There is no desire shown to trade in future engagements as the prices are closer to the spot price than at any time this year. Arrivals thus far this month amount to 1295 tons, and afloats it is estimated aggregate 3210 tons. Shipments from the Straits for the first half amounted to 2260 tons, which is pretty close to the figure for the corresponding period of last year, 2305 tons.

Copper.—No improvement in the condition of this metal can be noted. The situation has, in fact, grown worse and prices fell off somewhat during the week. Offerings are large, but the demand is slight. Reports from consuming centers do not show any improvement, and the markets abroad are no better off than they have been of late. Lake declined .10c. during the week to 11.40c. to 11.60c. for delivery of spot to February. Electrolytic and Casting for the same delivery are quoted 11.25c. to 11.40c., and Standard is nominally 10.62½c. The London market declined proportionately to £50 16s. 3d. for spot and £51 1s. 3d. for futures. Best Selected declined 5 shillings to £54 15s. Exports amount to 6600 tons so far this month.

Pig Lead.—The market is unchanged, the official quotation still being based on 4.12½c. for spot Desilverized and 4.10c. for futures. The London market, after advancing to £10 16s. 3d., closed £10 15s. to-day.

Spelter—Is very weak, and there is almost a total absence of business. Prices have undergone further decline, and at the close to-day the nominal figure of 5.25c. prevailed. December declined to 5.15c. and St. Louis wired sellers at 5c. The London figure is unchanged, £19 10s.

Antimony.—The market is unchanged and as follows: Cookson's, 9c. to 9½c.; Hallett's, 7¼c. to 7½c., and other brands, 7c. to 7¼c.

Nickel.—No change is noted. Large quantities down to ton lots are now quoted at 40c. to 47c. per lb., according to size and terms of order. Smaller lots are quoted as high as 60c., according to quantity.

Quicksilver.—The market is quiet and unchanged, the ruling quotations being $48 per flask of 76½ lbs. each in lots of 50 flasks or more. London is unchanged at £8 15s.

Tin Plate.—An increased amount of business is reported by the American Tin Plate Company at the new quotation, which is on a basis of $3.60 per box of 14 x 20 100-lb. Cokes, f.o.b. mill, and $3.79, f.o.b. New York. Representatives of outside mills are also reaping the benefits of lower prices, it being said that in some instances they have shaded the price of the American Tin Plate Company. Swansea declined 1½ pence to 11 shillings 9 pence.

John Stanton reports the Copper production in the United States and of the foreign reporting mines and United States exports as follows, in gross tons of 2240 lbs.:

	Reporting mines.	Outside sources.	Total U.S. product.	Product foreign mines.	U. S. exports.
First half 1895	70,612	9,100	79,712	42,484	34,215
Second half 1895	84,885	6,600	91,485	43,674	30,507
Total 1895	155,497	15,700	171,197	86,178	64,722
First half 1896	94,180	7,200	101,380	42,255	58,216
Second half 1896	95,314	7,200	102,514	43,941	67,287
Total 1896	199,494	14,400	203,894	86,196	125,503
First half 1897	103,651	5,000	108,651	44,263	64,870
Second half 1897	100,555	6,900	107,455	44,007	64,340
Total 1897	204,206	11,900	216,106	88,270	129,210
First half 1898	112,687	7,800	120,487	40,880	68,284
Second half 1898	103,535	10,250	113,785	43,674	76,831
Total 1898	216,222	18,050	234,272	84,554	145,115
First half 1899	111,987	12,500	124,487	43,629	56,460
Second half 1899	118,818	18,900	137,719	45,611	63,351
Total 1899	230,806	31,400	262,206	89,240	119,811
First half 1900	114,177	20,400	134,577	43,153	90,747
Second half 1900	113,810	20,400	134,104	46,278	63,335
Total 1900	227,987	40,800	268,681	89,431	160,082
First half 1901	112,794	20,600	133,394	46,847	50,027
Second half 1901	110,561	21,300	131,861	53,394	44,339
Total 1901	223,355	41,900	265,255	100,241	94,366
First half 1902	117,748	22,700	140,448	52,546	97,960
July, 1902	22,749	4,000	26,749	9,210	11,733
August, 1902	23,196	*2,100	25,296	9,504	12,429
September, 1902	23,688	2,100	25,788	9,155	13,183
October, 1902	24,152	2,100	26,252	9,707	12,515

* The decrease in "Outside Sources" this month and following is caused by the largest of them becoming "Reporting Mines."

The New York Machinery Market.

NEW YORK, November 19, 1902.

Conditions are unchanged. A number of good orders have been placed during the last few days with the prominent houses, but the general demand has undoubtedly fallen off somewhat. This situation prevails in all branches of the machinery trade, but is emphasized in the machine tool quarter. Here it is now reported that fairly good deliveries can be obtained in ordinary sizes of tools, and the indications point to even considerably better deliveries within a short time, as several of the important machine tool builders have large lots of certain tools going through their shops, which will go into stock unless there is an increased demand. While there is a little talk of some of the big houses cutting prices, especially on good sized jobs, the average values of standard tools are being well maintained. This is especially true on such tools as are built by the members of the National Machine Tool Builders' Association. Those builders are holding to the lists agreed upon with commendable firmness. That the present strong tone of the market as to values is largely due to the stand of this body of machine tools builders, is the view generally accepted in the trade.

Despite the apparent lull in demand the situation is not being viewed with alarm. The consensus of opinion in the street is that if a fairly bold front can be maintained during the balance of this year there will be a renewal of activity early next year, which will abridge the present lull.

Machinery merchants are submitting bids on two good sized lists which are being controlled in this city. Henry S. Flemming, whose offices are at 1 Broadway, has a list out of something like $100,000 worth of machine tools. Mr. Flemming is out of the city at present, but it is expected that he will return before the end of this week. The machinery which he contemplates purchasing, it is said, is for the equipment of a steel car plant to be erected in the vicinity of Buffalo. W. K. Vanderbilt is said to be interested in the project, and from his association it is deducted that the plant will be erected in the interests of the New York Central system. Mr. Flemming is also identified with the Anthracite Coal Operators' Association.

Richard L. Newman, consulting naval engineer, with offices in the Cheesboro Building, 17 State street, has sent out a good sized list for estimates. From the types of the tools required it is deducted that they are intended for a new shipbuilding plant. As the details of organization of the company which will require the machinery are not perfected, no information as to this project can be obtained at this time. Mr. Newman, it will be recalled, was formerly connected with the New York Shipbuilding Company.

The New York Central Railroad are buying a good quantity of machinery nowadays. While they are not issuing long lists for lump purchases, they are buying continually for increasing the efficiency of their various shops.

A number of machinery men were at Schenectady yesterday closing up orders on additional machine tools. The company are being followed closely by the trade, as it is believed that they will be buying for their new turbine shop for some time to come.

Pedrick & Ayer are moving into their new shops at Plainfield, N. J. H. S. Manning, who controls this company, stated yesterday that the new shops would be devoted to the production of pneumatic tools and railway specialties of all types.

It is reported in the street that Manning, Maxwell & Moore obtained an order from the Vermont Farm Machinery Company of Bellows Falls, Vt., for 88 Reed lathes ranging up to 24-inch swing. The order, we are informed, was taken by the Boston office of Manning, Maxwell & Moore.

It is expected that next week the scope of the improvements to be made at the Franklin, Pa., plant of the Chicago Pneumatic Tool Company will be known. The directors are to meet toward the close of this week and discuss the matter. It is intended, roughly, to double the capacity of the present plant, and the company's engineers are now at work on the preparation of specifications for the requisite equipment.

The Chicago Pneumatic Tool Company just closed an order with the Navy Department for 78 tools of various types, to be used at the New York Navy Yard in the construction of the battle ship "Connecticut." They also received an order from the American Locomotive Company for 75 pneumatic tools.

M. H. Treadwell & Co. of 97 Liberty street are finishing the purchase of about $40,000 worth of machine tools which are to be installed by the M. H. Treadwell Company of Pennsylvania at their Lebanon, Pa., plant. The former concern serve as a selling company for the latter company. They have just closed a contract to furnish the Lackawanna Iron & Steel Company of Buffalo with 20 10-ton hot metal cars, which will be distributed among the Lackawanna Company's furnaces as follows: Eight cars to Colebrook furnaces, Lebanon, Pa.; eight to Bird Coleman furnaces, Cornwall, Pa., and four to North Cornwall furnaces, Cornwall, Pa.

The work on the new plant of the American Tube & Stamping Company, Bridgeport, Conn., has been delayed somewhat, but has now been resumed and will be pushed aggressively.

The Niagara Radiator Company of Buffalo, N. Y., have purchased about four acres of land adjoining their present plant and are now preparing plans for a good sized plant for the manufacture of cast iron boilers for steam and hot water, which they are just placing on the market. The plans are not far enough advanced to show just what will be required in the way of machinery and equipment. Charles F. Walther, the president of the company, is taking personal charge of the new work.

The Nonpareil Cork Mfg. Company, who have factories at Bridgeport, Conn., and Camden, N. J., suffered a destructive fire last week, which left only the power plant of their Camden works. Plans for resumption have not taken definite shape, although it is expected to rebuild at once. A large proportion of the machinery required will be of special design, but it will be necessary to purchase a considerable quantity of electric motors, sanding machines, saws, saw tables, transmission machinery and some machine tools. The present office of the company, where the rebuilding will be superintended, is located on Fort Jefferson street, Camden, N. J.

Included in miscellaneous naval supplies to be purchased by the Bureau Supplies and Accounts are a duplex air compressor for the Boston Navy Yard and an electric cable and traveling crane for the New York Navy Yard. The bids will be opened on November 25.

Stone & Webster of Boston are back of the Pierce County Improvement Company, who are about to commence the improvement of one of the largest water powers on the Pacific Coast. The scheme contemplates the use of power to be derived from the Puyallup River, which has its origin in the glacier of Mount Ranier, State of Washington, and flowing northwest empties into Puget Sound near Tacoma. A dam will be thrown across the river, the water diverted and carried by flume and ditch a distance of 10¼ miles, where it will discharge into a fore bay, from which steel pipes leading to the power house will be taken, giving a net head on the wheels of 850 feet. The present development will be for 20,000 horse-power. The flume will be built with a section 8 feet wide by 5 feet high, the hight to be increased later to 7 feet, to provide for the ultimate development of the plant. The ditch will be slightly larger. The fore bay will not be less than 500 x 300 x 14 feet deep, holding water enough to carry the full load of the plant for two hours. The design providing for the location of the storage pond above the station eliminates all chance of interruption to the operation of the plant by reason of accident to the flume. Two steel pipe lines, approximately 1700 feet long, will convey the water to the power station. The power station will be of brick, and will contain four impulse wheels directly connected each to a 3500-kw. generator; also necessary transformers, switchboards, &c. The power will be generated at 2300 volts alternating and stepped up to 40,000 to 50,000 volts, and then transmitted to the cities of Tacoma and Seattle, a distance respectively of approximately 30 and 40 miles from the power station. The very latest improvements in hydraulic and electrical engineering will be embodied in the new plant. Plans and specifications for the work are well under way, and contracts for the electrical apparatus will be awarded within a week. Men are now in the field making necessary locations and surveys for carrying out the work. It is hoped that the plant will be in operation shortly after January 1, 1904.

Plans are being prepared by A. E. Winchester, general superintendent of the City of South Norwalk Electric Works, South Norwalk, Conn., for a municipal electric plant. The equipment required will include one 250 horse-power four valve high speed engine, simple noncondensing type, direct connected to a 150 kw. 220 to 250 volt multipolar direct current generator; also one 130-light five ampere arc generator, direct connected to an 85 horse-power 220 to 270 volt motor and all necessary appurtenances.

The boilers to be used by the Massachusetts Electric Companies and the Boston Edison Company in connection with the General Electric turbines, of which we made mention last week, have not been closed on as yet.

The Babcock & Wilcox Company of 85 Liberty street, obtained the boiler order of the Cincinnati Traction Company. It called for 4000 horse-power. They also closed a 5000 horse-power plant for the Atlas Cement Company at Northampton, Pa., and a 3000 horse-power plant for the Hannibal, Mo., plant of the same company. They were also awarded the 1200 horse-power of boilers to be installed by the Paxteng Electric Company of Harrisburg, Pa., and the 9250 horse-power plant of the Metropolitan Street Railway Company at Kansas City, Mo.

Several local engine and boiler representatives will file bids to-morrow for furnishing a complete central power station to be installed by the Department of Parks of New York for the Brooklyn Institute of Arts and Sciences. The plans, which were prepared by McKim, Meade & White of 160 Fifth avenue, are to be seen at Litchfield Mansion, Prospect Park, Brooklyn.

At a recent meeting of the Board of Directors of the Keystone Driller Company, Beaver Falls, Pa., a committee consisting of R. M. Downie, secretary; D. A. Messner, superintendent, and E. O. Eyer, sales manager, was appointed to report on the several locations offered for rebuilding their plant, which was recently burned. The company have decided to buy considerable new machinery in the way of lathes, drill presses, planers, shapers and other tools, to put in a temporary building, in order to care for their trade until the new works are built.

Arthur P. Prier has resigned as president of the National Brass Mfg. Company, Kansas City, Kan., and has been succeeded by A. C. Hunt.

The new crucible steel plant of the Jessop Steel Company, at Washington, Pa., has been put in partial operation. This is one of the most complete crucible steel plants in this country and was designed and erected by James J. Mahon, consulting engineer, Hamilton Building, Pittsburgh.

Iron and Industrial Stocks.

At the time of going to press last week it was supposed that the liquidation in stocks had run its course. This proved not to be the case, as the movement continued and became even more violent, Friday and Saturday being marked by a heavy outpouring of stocks, which in many cases came from investors of long standing. The prices reached on that date proved attractive to bargain hunters, and a buying movement set in which checked further decline. The stock market since that time has been in somewhat better condition, but while prices have reacted from the lowest then reached the financial conditions are not favorable to much advance. It is particularly worthy of comment in this connection that industrial stocks suffered no more from liquidation than the best class of railroad stocks. Following are the lowest prices touched on a few leading stocks during the week, with the highest price on Tuesday of this week: Steel common, 35½-37⅛; preferred, 82¾-84⅞; Colorado, 80½-87½; Pressed Steel common, 57½-58¾; Republic common, 18-19⅛; preferred, 74-75½; Tennessee, 54⅝-57; Pipe preferred, 45-50.

The directors of the Standard Oil Company have declared a quarterly dividend of $10 a share, or $9,750,000, on the outstanding capital stock of $97,500,000. This is the fourth quarterly payment, making dividends of $45 a share, or $43,875,000 for the year. For the first quarter a dividend of $20 a share was declared; for the second quarter, $10 a share; for the third quarter, $5 a share, and for the last, or present quarter, $10 a share. The aggregate disbursements of the company for the current year are fewer by $3 a share than in the preceding year, when $46,800,800 was paid to shareholders. Forty-eight per cent. was also paid during 1900. Within the last three years the Standard Oil Company have paid to stockholders in the neighborhood of $140,000,000. In this connection it may be said that aside from the United States Steel Corporation the Standard Oil Company disburse more money in dividends than any other corporation in the world.

Dividends.—The directors of the National Fire Proofing Company, Pittsburgh, have declared the regular quarterly dividend of 1¼ per cent. on the common stock, payable November 25.

The American Steel Foundries Company have declared a quarterly dividend of 1½ per cent. on the preferred stock, payable December 1.

Our Foreign Trade in October.

The regular monthly statement of the foreign trade of the United States, issued by the Bureau of Statistics of the Treasury Department, for the month of October, compared with the corresponding month of last year shows:

Merchandise:	1902.	1901.
Imports—Free of duty	$33,200,636	$35,046,444
Dutiable	54,286,891	46,400,319
Totals	$87,487,527	$81,446,763
Exports—Domestic	$140,332,908	$143,754,440
Foreign	2,846,844	1,904,975
Totals	$143,179,752	$145,659,415
Excess of exports	$55,692,225	$64,212,652
Gold:		
Imports	$9,113,041	$9,138,638
Exports	1,446,514	4,066,747
Excess of imports	$7,666,527	$5,071,891
Silver:		
Imports	$2,766,734	$3,070,516
Exports	4,382,545	4,737,689
Excess of exports	$1,615,811	$1,667,173
From January 1 to October 31:		
Merchandise:		
Imports—Free of duty	$333,480,830	$312,547,648
Dutiable	456,158,116	415,376,684
Total	$789,638,946	$727,924,332
Exports—Domestic	$1,063,029,878	$1,168,536,695
Foreign	23,299,352	23,441,987
Totals	$1,086,329,230	$1,191,978,682
Excess of exports	$296,690,284	$464,054,350
Gold:		
Imports	$34,019,533	$44,538,680
Exports	32,442,833	36,747,316
Excess of imports	$1,576,700	$7,791,364
Silver:		
Imports	$21,470,578	$25,561,660
Exports	39,963,084	46,225,618
Excess of exports	$18,492,506	$20,663,958

Johnson V. Symons of Johnstown, Pa., has been appointed master mechanic of the Helmbacher Forge & Rolling Mill Company, of St. Louis, Mo.

PERSONAL.

Edward F. Goltra, president of the American Steel Foundry Company, St. Louis, Mo., has sailed for a short European trip.

William Kincaid, formerly superintendent of the threading department at the National works of the National Tube Company, McKeesport, Pa., has resigned to become general superintendent of the new tube mill of the Susquehanna Iron & Steel Company, Columbia, Pa.

Phillip Matter, upon the resignation of Geo. A. Swartout, has assumed the management of the Peru Steel Casting Company, Peru, Ind., as president and treasurer. Chas. A. Eastman is acting as assistant to the treasurer.

Henry C. Meyer, who founded the *Engineering Record* of this city 25 years ago, has decided to retire from active business and has accepted an offer from James H. McGraw to purchase that journal. Mr. McGraw thus adds the *Engineering Record* to his ownership of the *Street Railway Journal*, the *Electrical World and Engineer* and the *American Electrician*. Mr. Meyer will continue to act as an advisor in an editorial capacity in connection with the *Engineering Record*.

Extent of Damage to Williamsburgh Bridge.

Some of the wires that were injured by the fire on the New York tower of the Williamsburgh Bridge on the 10th inst. have been examined. These were the outside wires of the two south cables, which were subjected to the most intense heat, the two north cables being only slightly damaged, comparatively. Tests proved that these wires had lost a large percentage of their original strength. Just exactly how far the injury extended into the cable, or how many layers were affected, will not be known until further inspection. All the weak wires, for a few feet each side of the tower, will be cut out and new ones inserted.

The Harbison-Walker Refractories Company.—At a meeting of the above concern held in Pittsburgh last week a material increase was made in the capital stock. This increase was for the purpose of taking over the Portsmouth-Kentucky Fire Brick Company of Portsmouth, Ohio, and in doing this the original plans contemplated when the Harbison-Walker Refractories Company were organized are being carried out. The Portsmouth-Kentucky Company will, like the other constituent members of the Refractories Company, continue to be operated independently, as in the past, and under the old management, the objects aimed at in the effecting of the consolidation having been largely the formation of a securities holding company, through which large economies in the placing of raw materials used in the various processes of manufacture could be taken advantage of, while at the same time the former competition for business would be preserved by retaining the individual managements as in the past.

The Malleable Iron Consolidation.—CHICAGO, ILL., November 18, 1902.—(*By Telegraph.*)—It is authoritatively stated here that the combination of nine malleable iron casting plants is an accomplished fact. The preliminary steps, which were taken at the Waldorf-Astoria, New York City, last week, have been followed by detailed arrangements in Chicago during the past few days, and it is now only a question of a very short time when the name of the company and the officers elected will be announced. The capital stock is said to be $20,000,000. One at least of the Milwaukee companies reported to be interested have disclaimed any intention of entering the combination. Chicago will be the headquarters of the new company.

During the week ending November 9 open hearth furnace No. 6, at the Illinois Steel Company's South Chicago works, ran 23 heats, producing 775 tons of steel. This is the best record of an open hearth furnace at Chicago, and it is believed to be the highest record of any open hearth furnace in this country.

HARDWARE.

ONE of the problems which confronts those who are conducting business enterprises on a large scale is how to retain the advantages of the personal element when there are so many influences which militate against it. The principle underlying the common saying that corporations have no souls manifests itself in many ways, and the tendency in modern methods is to make it increasingly difficult to maintain a personal relationship between the seller and his customers. The formation of huge consolidations diminishes the force of the ties which under the old method of individual contact and relationship united merchants very frequently in a manner that gave something of a human warmth and touch to purely business transactions, and, in fact, constituted a valuable asset, as business relations of this character tended to be permanent, and merchants could count upon the continued patronage of their customers with more confidence than is now ordinarily justified. The volume of business is very much greater than in former days, and necessarily so, because with the diminished margins there must be greater sales in order to achieve success. With this volume of business there is naturally the adoption of system and routine, which as impersonal methods militate directly against the influence of personal element. The spirit of the times also conspires against the continuance of business relationship merely or even largely on the score of friendship or the desire to favor an individual with whom it would be pleasant to transact it. The merchant, if his time is not engrossed over much with the details or the larger problems of his business, is glad to see one who has been visiting him for years, with whom there is, apart from acceptable and satisfactory treatment in a business way, a certain congeniality and even attachment, which, other things being equal, would turn business into his hands. This loyalty in the old days often endured the test imposed upon it by the promise or offer of a shade better price from a new house and the opportunity to change to a line in some respects more attractive, and in spite of the fact that some business considerations were disregarded orders continued to go in the old channel. The trend of things of late has been to do away with this old time spirit, which had its amenities and even advantages, and while houses will be found where personal relations outweigh such business considerations, the number is rapidly diminishing. It is recognized that business must be conducted on business principles and that if these are violated in the interest even of personal acquaintanceship and regard the enterprise is likely to come to grief.

While this, however, is the case it must not be assumed that business has become entirely impersonal and that relations which have been established are without value. The surprising thing is that in spite of all the influences which tend to diminish the importance of the personal element it continues to be a real and permanent power. The hold which the salesman has on his customers is a good part of his capital in trade, and instances are constantly occurring in which this acquaintance is found to be the basis of a new and more advantageous connection, or even of the establishing of a new enterprise. Suggestive evidence of the value of this close relationship between the buyer and the seller is afforded in the efforts made by great houses to maintain it. At the same time there are many illustrations of the penalty of disregarding it. The larger the house or corporation the more essential it is that its policy, its methods and the spirit which pervades it throughout should recognize the great place which even in modern business life is occupied by the personal element. How to utilize it in connection with the improvements connected with and characteristic of approved and progressive methods is one of the problems which confront the trade. Until is is satisfactorily solved the small house has certain indisputable advantages over the large house, and the individual manufacturer over combinations and consolidations.

Condition of Trade.

Manufacturers are experiencing a demand for their products somewhat in advance of that usually expected at this season, although orders are more in the way of covering immediate necessities than for future requirements. In some instances, however, the wants of the trade are being anticipated. The natural diminution of business incident to the approach of the new year is giving manufacturers an opportunity to catch up with the orders on their books, and in this regard they are in a better position than for some time. Although buying for next year has not become at all general, manufacturers express themselves as confident of a good business for the first half of next year. While the conservatism shown by manufacturers in advancing prices on most lines has been one of the peculiar features of the times, there is a feeling that prices on some goods are too high in proportion to the cost of material and labor. Indications point to the probability that goods have reached the extreme in price for the present. With the trend toward lower values, as indicated by recent reductions, lower figures may rule on some lines for next year's business. It is probable that price changes will be brought about without materially effecting the stability of the market. The congestion of freight traffic, resulting from a shortage of locomotives and cars, has become more pronounced during the week, particularly at Pittsburgh, though the trouble is more or less general throughout the country at large shipping points. Some manufacturers are refusing to ship freight over roads where this trouble is the greatest. The continued mild weather has had the temporary effect of reducing the number and size of orders received by jobbers for such goods as Coal Hods, Stove Boards, Stove Pipe, &c., as well as other seasonable goods. The announcement in another column of this issue that Hibbard, Spencer, Bartlett & Co. of Chicago have made arrangements to increase the efficiency of their Paint department by controlling a well-known brand of Paint will be of interest to the retail trade in general. This move on the part of one of the largest wholesale houses in the country emphasizes the fact that Paints have a legitimate place in Hardware stocks and that well-known and reliable brands are the most desirable ones for the retail trade to handle.

Chicago.

(By Telegraph.)

Jobbers have had reason to complain of the falling off in orders for seasonable goods, such as Stove Pipe, Stove Boards, Coal Hods, &c., because of the continued mild weather for this season of the year. Even the active ordering of Skates, Sleds, Ammunition and such material as sells readily at this season is experiencing a lull, dealers having been unable to dispose of first purchases thus far. There can be little doubt, however, but that there will be a renewed buying within a few weeks. But while there has been a falling off in the goods above

mentioned, the volume of general business has suffered but little, a general line of Standard and Shelf Hardware being taken in sufficient quantity to keep up the tonnage to the normal amount. Some manufacturers have announced an advance of 10 per cent. in the price of Coffee Mills, but few other changes have developed, although an advance of prices in Builders' Hardware seems to be in the air. Reports are current that the advance will be of a more gradual and conservative nature, however, than was the case a year ago. Probably one of the most unsatisfactory departments of the market is that of Screws, which are being sold at very heavy discounts, but aside from prices there is nothing discouraging, as there is quite a liberal movement. No change is reported in the condition of the Strap and T Hinge market, active and keen competition keeping up the interest of all in the trade. There is still a fair amount of ordering for spring delivery, but this is without special significance. Jobbers and merchants in the Heavy Hardware business are experiencing a lull at this time, but manufacturers of Blacksmiths' Material, and especially of Bolts and Bolt Stock, Nuts, &c., are being overwhelmed with business. The demand experienced by manufacturers for Wire and Nails for Western and Southern shipments has continued quite active with liberal shipments, the low rates of freight still controlling this trade to a considerable extent. The meeting of both manufacturers and jobbers of Hardware at New Orleans during the present week has been the theme of most interest, a large delegation having left Chicago for the Crescent City on Monday night.

St. Louis.

(By Telegraph.)

The repetition of recent reports of very favorable conditions in the Hardware market holds good for the week under review. The aggregate of the orders coming to hand at this time, while it may be slightly less than in September and October, is on the whole quite up to the standard for this season. A wide distribution of requirements is shown in the make up of the orders, proving in a convincing way that the dealers have confidence in future business conditions.

San Francisco.

PACIFIC HARDWARE & STEEL COMPANY.—The whole of the Pacific Coast has been thoroughly drenched with rains during the last two weeks, and as this is exactly what the farmers have been waiting for, the feeling throughout the coast is that the winter will be a good one and very gratifying to the farming community.

The harvest is now all over with, crops are gathered in and good prices received for the products. Money is coming in rather freely at the present time.

Export trade is still increasing with us, all steamers leaving for Oriental ports being crowded with freight. The whaling fleet from the north is just about arriving with cargoes of oil and bone after the year's cruise. The salmon fleet is also about all in from Alaska, where the season has been very prosperous.

Cleveland.

THE W. BINGHAM COMPANY.—There is no let up in the demand for all kinds of Hardware from this section. We are having an unusually good trade for this time of the year on Carpenters' Tools of all kinds, which shows that mechanics are busy now and expect to be for some time to come. There is a large amount of building going on in this section, for both manufacturing and business purposes, as well as residences.

Every one is experiencing some difficulty in getting prompt deliveries of material from the mills. The railroad companies are not in shape to move the immense amount of freight that is offered them on account of the lack of motive power. This trouble is felt all over the country—that is, all railroad companies are experiencing the same trouble.

There is a good demand for holiday goods—that is, for Cutlery and Fancy Hardware—and as money matters are easy there will be a lot of Christmas goods sold this year.

There is a good healthy demand for spring goods, such as Lawn Mowers, Steel Goods, Ice Cream Freezers, Wire Cloth, Netting and the like. Jobbers in this section feel confident that they will round up the year with largely increased sales over former years, but in face of the great demand for goods the range of profit is very low. However, on the whole, business in this section is quite satisfactory.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—The rush of business that we are now having is unprecedented at this season of the year. This is accounted for in many ways. One reason is the great prosperity prevailing over the country generally, another that our people in June, July and August thought that the drought had practically ruined our crops in several important sections of our territory. Later on the weather was so exceedingly favorable that the crop has proved to be larger than was expected, and with the beautiful weather for saving the crop, the quality as well as the quantity has improved. Taking it altogether, our farmers find that they have made a pretty fair crop throughout the country where the drought we supposed had cut it very short. As a result of this, merchants are now buying goods which they usually buy in the summer months, and it is needless to say that they want them shipped instantly.

We believe that the Hardware business was never quite so good at this season of the year as it is to-day. Prices are fairly well maintained. Collections good.

We are to-day entertaining the delegates of New England Hardware Manufacturers referred to in your issue of November 13. They reached us this morning at eight o'clock, and were taken in charge by the local Hardware people. They have enjoyed a street car ride through the principal streets of the city, have visited the State Capitol, shook hands with all the Hardware people in their offices, and have been shown through the store of the Gray & Dudley Hardware Company. They will be entertained at lunch to-day at the University Club, and this afternoon will take a tally-ho ride to Belle Meade, General Jackson's famous stock farm. They leave to-night for Chattanooga, where they will spend Sunday, leaving Sunday night for Birmingham, Ala. We hardly think Teddy Roosevelt is enjoying his bear hunt any more than these manufacturers are enjoying the trip South.

Baltimore.

CARLIN & FULTON.—Business is keeping up remarkably well, and while perhaps colder weather might stimulate some lines, yet on the other hand the mild temperature of this month has enabled all outdoor work to be continued without interference.

The declines on November 1 in Wire and Wire Nails and the reduction of November 15 on Shovels will have a beneficial effect in putting those staples on their proper basis, and will enable the trade to buy with more confidence, and, in fact, there may be some speculative value in those lines.

The delays in transportation are still the source of great annoyance to the trade, as a bill of lading is no evidence that goods will reach destination in proper time, it frequently being the case that the car is side tracked after having left its starting point, with the locomotive detached for some other purpose.

The general condition of the trade seems to justify the belief in the continuation of good business for some time to come.

NOTES ON PRICES.

Wire Nails.—There is a good movement, though demand is not up to the expectations of the manufacturers. Mill shipments are made with a good deal of promptness, but delays occur in transportation. It is understood that some outside manufacturers are offering Nails to retailers, in carload lots, at $1.85. Quotations are as follows:

Jobbers, carload lots	$1.85
Retailers, carload lots	1.90
Retailers, less than carloads	2.00

New York.—The local demand for Wire Nails is keep-

ing up to the expectations of the jobbing trade. The tendency is toward small orders, rather than the quantities which have been usual during the earlier part of the season. Quotations are as follows: Single carloads, $2.05; small lots from store, $2.10. The latter price is sometimes slightly shaded.

Chicago, by Telegraph.—There has been some falling off in the jobbing trade during this week, but manufacturers have continued to experience a liberal run of orders. Less and less is heard of any disposition to cut prices, there being a more confident tone prevailing, with official prices remaining stationary at $2 in carload lots and $2.10 in less than carload lots, mill shipment, Chicago.

St. Louis, by Telegraph.—General conditions in Wire Nails are reported by the jobbing trade to be about the same, and store trade is in fair volume. Small lots continue to be quoted at $2.15.

Pittsburgh.—Some of the manufacturers report a better demand for Wire Nails, and the general condition of the market is fairly satisfactory. Specifications on old contracts are coming in more freely, and it is said more Nails are moving than for some time. We quote Wire Nails at $1.85 in carloads to jobbers, $1.90 in carloads to retailers and $2 in small lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days. For galvanizing Nails 75 cents per keg is charged and for tinning Nails $1.50 per keg extra.

Cut Nails.—The demand is largely for present requirements, which, in the aggregate, amount to a fair volume. The market is reported as being firm at the following quotations: $2.05, base, in carloads, and $2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination; terms, 60 days, less 2 per cent. off in 10 days.

New York.—The local demand for Cut Nails is in about the usual proportion to Wire Nails. The market is firm at the following quotations for carloads and less than carloads:

Carloads on dock	$2.18
Less than carloads on dock	2.23
Small lots from store	2.30

Chicago, by Telegraph.—No improvement has been noted in the delivery of Cut Nails, but the market has been without special activity, although steady. Prices remaining unchanged on the basis of $2.15 in carload lots and $2.20 to $2.25 in less than carload lots, Chicago.

St. Louis, by Telegraph.—In small lots from jobbers' store Cut Nails are quoted at $2.30.

Pittsburgh.—We note a moderate demand for Cut Nails, which is confined mostly to carloads or less quantities. Fixed prices are said to be firmly held, and Iron Cut Nails, for which there is a good steady demand, bring about 10 cents advance over Steel. We quote Steel Cut Nails as follows: $2.05, base, in carloads, and $2.10 in less than carloads, plus freight in Tube Rate Book to point of destination, terms 60 days, less 2 per cent. off in 10 days.

Barb Wire.—The amount being sold is not satisfactory to the manufacturers, although the demand is fair. Buyers are not specifying on old contracts as liberally as the mills would desire. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$2.15	$2.45
Retailers, carload lots	2.20	2.50
Retailers, less than carload lots	2.30	2.60

Chicago, by Telegraph.—The tonnage of Barb Wire moving continues very satisfactory, and indeed very liberal, even for this season of the year, and prices are, as a rule, well maintained. Official quotations for Galvanized are as follows: $2.60 for carload lots and $2.70 in less than carload lots; while Painted is sold at $2.30 in carload lots and $2.40 in less than carload lots, Chicago. There is a demand for staples, and the market is steady at $2.05 in carload lots and $2.15 in less than carload lots.

St. Louis, by Telegraph.—The demand at the present time for Barb Wire is a fair one, and some little new inquiry is beginning to show up in small lots from jobbers' stocks. Painted is quoted at $2.50 and Galvanized at $2.80.

Pittsburgh.—From some sections of the country a good demand for Barb Wire is reported, but at other places it is dull. Specifications on contracts are not coming in as freely as anticipated. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days: Painted, $2.15; Galvanized, $2.45, in carload lots to jobbers; Painted, $2.20; Galvanized, $2.50, in carloads to retailers; Painted, $2.30; Galvanized, $2.60, in small lots to retailers.

Plain Wire.—The tone of the market is referred to as firm, while demand is only fair. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.75
Retailers, carloads	1.80
Less than carloads	1.90

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	Plain.	Add Galv.
6 to 9	Base.	$0.30
10	Advance over base	$0.05 .30
11	" " "	.10 .30
12 and 12½	" " "	.15 .30
13	" " "	.25 .30
14	" " "	.35 .30
15	" " "	.45 .60
16	" " "	.55 .60
17	" " "	.70 1.00
18	" " "	.85 1.00

Chicago, by Telegraph.—There is very heavy specifying on old contracts and some new business. The market remains steady as previously quoted, carload lots selling at $1.90 on track and $2 from store, Galvanized bringing 30 cents extra.

St. Louis, by Telegraph.—In line with other staple goods in the Wire market, Plain Wire is quoted by jobbers in small lots from store as follows: No. 9, $2.10, and Galvanized $2.40.

Pittsburgh.—There is a moderate demand, and the general tone of the market is firm. We quote Plain Wire, $1.75, base, for Nos. 6 to 9 in carloads to jobbers, $1.80 in carloads to retailers and $1.90 in small lots to retailers; Galvanized, 30 cents extra for Nos. 6 to 14 and 60 cents extra for Nos. 15 and 16.

Sap Spouts.—Charles C. Stelle, 81 Fifth avenue, Brooklyn, N. Y., announces the following prices for Post's Eureka Sap Spouts:

No.	Per 1000
1 Regular	$16.00
2 Regular	13.00
1 Short	14.50
2 Short	11.50

The goods are sold f.o.b. New York, terms net cash March 20. Prices are guaranteed not to be lower during the season, but are subject to advance after December.

Spring Hinges.—The Chicago Spring Butt Company, Chicago, Ill., are issuing a small pamphlet with revised lists of those of their Spring Hinges which are most popular. These prices go into effect on November 20.

Roofing and Building Papers.—One of the conditions in this line of trade has been the phenomenal demand for goods of this character since summer, all the manufacturers being reported as slow in making deliveries. Prices on a full line of Tarred Roofing Felts have been advanced approximately 10 per cent. Tarred Single Ply Roofing Felt is quoted at $31 to $35 a ton, the former being the carload rate for New York and adjacent territory, the latter being for less than carloads, although some sections pay as high as $41 per ton, contingent on the distance from source of supply and freight. Two-Ply Tarred Felt is 60 to 65 cents per roll; Three-Ply 80 to 90 cents. Building Papers have stiffened somewhat, the advance being equivalent to about $1 a ton. Deadening Felts have advanced $5 to $6 per ton, the combination price being $41 per ton, but owing to the scarcity dealers are actually getting as high as $45.

Cordage.—Manufacturers are now entering upon the annual dull season of two or three months, and the demand for Rope is not expected to be large during that period. Manila Rope, on a basis of 7-16-inch and larger, is quoted at 12 to 12¼ cents per pound. Sisal Rope, on the same basis, ranges from 8½ to 10 cents per pound. The lowest quotation on Sisal represents the price for Mixed Rope or substitutes. Manufacturers are prepared to make so-called Sisal Rope of a quality to correspond to the prices which buyers desire to pay, down to 8½ cents.

Glass.—The meeting between representatives of the National Window Glass Jobbers' Association and representatives of the American, Federation and Independent Window Glass companies, held at Pittsburgh last week, resulted in the strengthening of the association instead of its dissolution, as was feared might be the case. The plan reported to be under consideration is to have allotments of Glass made each month to the members of the Jobbers' Association, and that any member cutting prices will not be able afterward to buy Glass of any of the combined manufacturers. This agreement to be effective must be signed by each member of the association, also by all of the three combined manufacturing companies. By this plan the association hopes to stop price cutting by its members. The claim is made that there is only 10 to 15 per cent. productive Glass capacity in the United States outside of the combined companies, and that this is not enough to influence the market unfavorably. The recent cutting of the prices made by the combined factories by members of the association, which has caused the trouble is attributed to the lack of demand and the eagerness to capture what business there was going. The Jobbers' Association quotations are as follows, for single and double strength Window Glass:

	Discount.
From store	88 and 5 %
F.o.b. factory, carload lots	89 and 5 %

Paints and Colors.—*Leads.*—The demand for White Lead in Oil shows a falling off at the approach of cold weather. The season for outside work is near its end, though there is considerable indoor work at this point uncompleted. Quotations are as follows: In lots of 500 pounds or over, 6 cents per pound; in lots of less than 500 pounds, 6½ cents per pound.

Oils.—*Linseed Oil.*—The demand, which has been for small lots, of a hand to mouth order, has fallen off perceptibly within the past week. Crushers, as a rule, are reported as not having much Oil on hand, and if demand were large prices would probably advance. Under present conditions this is not considered likely. City Raw is quoted, according to quantity, from 46 to 47 cents per gallon. State and Western brands are quoted, on the same basis, from 44 to 45 cents.

Spirits Turpentine.—The week has been one of slight fluctuations in the Turpentine market, the tendency being toward lower prices. Quotations, according to quantity, are as follows: Southerns, 53 to 53½; machine made barrels, 53½ to 54 cents per gallon.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

The Dixie Hardware Company, Anniston, Ala., advise us that they would be pleased to receive catalogues and quotations on Mechanics' Tools and kindred lines.

A. J. Baldwin & Co., Dawson, Ga., have disposed of their stock of General Hardware to J. C. and E. W. Hollingsworth, who will continue the business under the style of Dawson Hardware Company. The new firm will appreciate copies of catalogues and other printed matter relating to their business.

On January 1, 1903, E. C. Walton, treasurer of the J. S. Kent Lumber Company of Philadelphia, will enter into partnership with V. S. Pownall in the Hardware and Agricultural Implement business, both wholesale and retail, at Coatesville, Pa. The firm will be known as Pownall & Walton. They will be pleased to receive catalogues and quotations from manufacturers of Mill Supplies, &c.

FRANK MOSSBERG COMPANY.

FRANK MOSSBERG COMPANY, copartnership, Attleboro, Mass., have incorporated with a fully paid up capital of $110,000. The company will continue and extend the present lines of manufacture. It is not intended at present to build new works, the present factory being large enough to admit of the very considerable additions of machinery and tools which the new company will at once make to the existing plant, but the increase of the business from its establishment three years ago has been so rapid and the outlook for still greater increase in the immediate future is so promising that it is probable that the question of building a new factory is one which the company will be obliged to take up before a very great while. The main business of the company will be the manufacture of Sheet Metal Punchings and Stampings, and the production of finished articles therefrom, in addition to which they will operate a thoroughly equipped machine shop for the manufacture on order and contract of Dies, Special Tools and anything in the line of light machinery; making a specialty of perfecting new inventions and mechanical development of experimental devices. They will continue to manufacture their specialties in Bells, Wrenches, Clock, Gongs, &c. They have this season largely increased their line of Bicycle, Automobile, Machinists' and Pipe Wrenches. They advise us that the advance orders already received this season for this class of goods indicate a materially increased demand for them. The company refer to their export business in Wrenches and Bells as growing very rapidly, and up to this time it is said to be more than double what it was during the corresponding period last year.

ST. LOUIS SCREW COMPANY.

THE ST. LOUIS SCREW COMPANY are erecting a fine plant at the intersection of Clarence and Bulwer avenues, St. Louis, Mo., in the neighborhood of the new Colorado freight yards. The buildings will cover a plot 150 feet front on Bulwer by 350 feet on Clarence avenue, and will be heated by the blast system and lighted by the Nernst electric glower system. It has been found more serviceable and economical to have all the work and material handled on one floor rather than in a five or six story building. The plant will include a forge shop for fine tool steel, a machinery work room, engine and boiler rooms, wash rooms, office and warehouse. The plant will cost $65,000, and an additional $125,000 will be spent in machinery and equipment. The buildings will be ready by February 15 next.

A. B. CASE, treasurer of the Blair Mfg. Company, Springfield, Mass., manufacturers of Lawn Mowers, is responsible for the following little poem in two sections:

When the grass grows green in the spring,
The Lawn Mower maker has a dead sure thing.

Having composed the foregoing and sent it off to W. H. Coldwell of Newburgh, N. Y., the other side of the picture occurred to Mr. Case and another stanza was added:

But when gentle spring comes in with a drouth,
The maker of Lawn Mowers is "down in the mouth."

ERNEST S. COX, who for over 12 years has been in the employ of R. K. Carter, Hardware buyer, New York, is now the Vice-President of the Hardware Jobbers' Purchasing Company, 102 Chambers street, New York. Mr. Cox for a number of years has had charge of much of the inside work of Mr. Carter's business, traveling also as occasion required. He is making an extensive tour through the West in the interest of the house with which he is now connected.

THE NEW ORLEANS CONVENTIONS.

THE joint meeting of the jobbers and manufacturers in the New St. Charles Hotel, New Orleans, the opening sessions of which are being held to-day (Wednesday), is largely attended by the members of both associations and by many ladies and other guests. While the interest in the work of each association is increased by the fact that their conventions are held simultaneously, thus bringing out a thoroughly representative attendance, there is no doubt that many have been influenced by the attractions of New Orleans. The local committee under the chairmanship of Colonel Eshleman have made careful and elaborate preparations for the entertainment of their guests, the ladies being cared for also by a special committee.

The following Reception Committee of the jobbers' association has been appointed and is working in harmony with the Reception Committee of the manufacturers' association:

Irby Bennett, chairman.	Albert Sisson.
E. H. Britton.	Thos. Ellis.
Porter Hale.	Edwin Perry.
N. A. Gladding.	J. T. Powell.
Frank Auerbacher.	Jas. Hildreth, Jr.
Geo. H. Harper.	E. E. Paine.
H. H. Beers.	Frank Davis.
Walter P. Hudson.	Charles King.
Louis Rice.	Edw. Kemp.
John Mapp.	John K. Wilson.
H. W. Caldwell.	Charles Huntington.
D. A. Merriman.	George L. Haven.
Robert Brinkley.	T. W. Gathright.
John Hoen.	W. P. Smith.
Thos. H. Gossett.	Augustus Baldwin.
Jos. Hottel.	Sidney Eshleman.

FIRST SESSION OF THE JOBBERS.

The open session of the eighth annual convention of the National Hardware Association was called to order in the Palm Garden of the new St. Charles Hotel this (Wednesday) morning at 10 o'clock, with a large number of delegates, manufacturers and ladies present. The session opened with the singing of "My Country, 'Tis of Thee," in which all present joined with much enthusiasm.

R. A. Kirk, president of the National Hardware Association, made a brief address, expressing the hope that the sessions of the convention would prove profitable to the jobbers and manufacturers, and introduced the Rev. Davis Sessums, D.D., Bishop of Louisiana, who offered a short prayer. A formal address of welcome was extended by the Hon. Paul Capdevielle, Mayor of New Orleans, which was followed by welcoming addresses from the following gentlemen: Dr. D. E. Alderman, president of Tulane University of Louisiana; T. J. Woodward, president of New Orleans Board of Trade, and J. A. Wogan, president of the New Orleans Sugar Exchange. President Lee and Secretary Hardy of the Canadian Wholesale Hardware Association were then introduced, and each made a brief address.

President Kirk then made his annual address, as follows:

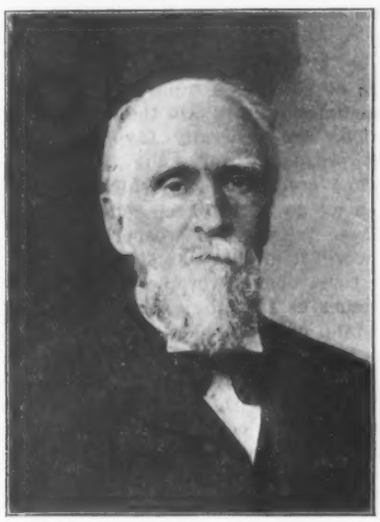
President Kirk's Annual Address.

It is under very favorable auspices that we have come together for our eighth annual meeting. Our association was not only born under very different conditions, but we recognize the fact that these different conditions were the creating agency of its birth. We cannot forget that this body came into existence and took tangible form out of the troubles that environed us, a heritage that had fallen to us, as well as to other business interests, through the mistakes of previous years, reaching its culmination in the panic of '93, whose baneful consequences followed for years afterward.

I have lately been greatly interested in looking over the proceedings of our meetings in those years, and especially in reading closely the annual addresses of my predecessors. We are not compelled to go far back to note the changed conditions between those days and to-day, and also the standpoint from which the president in those troublesome years addressed the association, as contrasted with the ground on which we now stand.

ONLY FIVE YEARS AGO,

at the Buffalo meeting, our honored first president in his address, in referring to the business conditions of the times and the prospects ahead, summed up the situation in the following words: "I do not stand before you as a pessimist, for I do believe that there has been recent improvement in trade conditions, and in the outlook for the future there can be seen 'the silver lining of the cloud.' But let us not deceive ourselves. I believe that for a few years to come, under the most favorable view of the case, it will require the most careful and prudent management of those engaged in the distribution of Hardware and kindred lines, be they either in the capacity of manufacturer, wholesale or



R. A. KIRK.

retail merchant, to regain what has been lost of capital, energy and labor during the last four years."

This was the recognized and accepted view of the situation only half a decade ago, and yet within a few months from that date the "silver lining," which could then be so dimly seen amid the mists and clouds that were hanging over the land, had extended over the skies, and the most pronounced pessimist among us was forced to admit that better times had come.

Now for five years these improved conditions have continued. There have been "ups and downs," and the former have not always had the best of it. But the general conditions have been steadily favorable and, along with other business interests, Hardwaremen have prospered.

A WONDERFUL ERA.

We are all aware, and yet we do not recognize the full force of it, that we are passing through a unique era of commercial, financial and industrial development; undoubtedly the most remarkable period of business evolution in the history of our country and of the world. In these five years we have witnessed commercial and industrial expansion and a financial movement that the world never dreamed of before; nor is it confined, as we sometimes may think, to industrial plants and giant corporations. It reaches every business and every man in touch with the affairs of the world. The farmer in Texas and Minnesota feels it alike with the transcontinental railroad that runs through his farm, or with the factory in the distant city.

We may not like all its phases and we may seriously

condemn some of them, but still we are living in a wonderful era.

I know of no more definite illustration of this than the fact that individual deposits in national banks are this year double what they were six years ago, reaching the stupendous sum of $3,200,000,000. The State banks have also considerably more than doubled the deposits in the same period, and the same is true of the deposits in trust companies, while savings banks have increased their deposits in this time more than $700,000,000. In short, the increase in deposits nearly equals the total deposits of all kinds six years ago. It is estimated by conservative financiers that during these six years the total wealth of the country has been increased more than $20,000,000,000.

It is for us, however, to remember that not only do these golden days come alike to us all as they are passing, but they will not always last to any of us. We shall not always find advancing or even steady prices and markets will not permanently continue to absorb stocks faster than they can be replenished.

It would be squarely against the experience of all the centuries if we were not to find the manufacturer at some day ahead urging the merchant to relieve him of some of his surplus stock, instead of having the merchant do the running, as he has done the last few years.

SOME PREGNANT FACTS.

There are no signs of a rapid radical change in conditions immediately ahead. On the contrary, we believe the indications are generally favorable for the continuance of prosperity for some time to come. But there are some pregnant facts which vitally affect the future which we do well to keep constantly before us.

First.—These five years of prosperity. To the citizens of another world it might seem strange that this should be a reason for a change for the worse, but human experience teaches us that the average inhabitant of this planet can stand only a moderate amount of prosperity, and, as it is true with the individual man, we find it to be true of the community and the nation. The sociological fact is that with continuous prosperity man, both individually and collectively, loses his head and invites disaster. The average manual laborer, whether skilled or unskilled, when he has had a few months' steady work, is too ready to go on a ruinous strike, while his fellow man in business, upon feeling the early waves of prosperity, is equally ready to court disaster by overexpansion and speculation, and thus sooner or later we all go down the hill together for a while. As Comptroller Ridgeley expressed in his address to the bankers' convention in this city last week, "It seems to be inevitable that we should have periods of rest and recuperation. They are apt to be most severe when we have been going too fast." He adds that the pace we have traveled the past five or six years has been a rapid one.

In prosperous times prices normally work on up till they reach a high level, from which they must sooner or later recede. There have been restraining influences at work in the last year or two that have tended to retard advances, and it is fair to say that prices in Hardware are generally not excessively high, in view of the enormous demand for goods, while prices on many lines of goods are certainly low. Still prices must be affected by such conditions as we have been passing through, and lower levels are to be expected at some time ahead.

Second.—The home demand for goods has been greatly increased by the remarkable prosperity of our great farming interests. In the final analysis, we all come to the farmer for our support. The farm products of the United States for the last few years have reached phenomenal figures. Out of their abundance our home demands have been supplied and the markets of the world have been largely fed, and thus our great export balance of trade has been kept up and gold has been held at home. The change in the condition of our average farming communities has been marvelous, and their purchasing power, as we have generally felt it, has been equally so.

The Lord of sunshine and rain, in His all wise plans, may give us many more continuous years of fat things; but, judging from the past, we may not expect exemption from years of leanness, when we shall be brought to realize that our best customer has suffered, and so will we all have suffered with him.

Third.—It is probable that our industrial interests will find hereafter closer competition in foreign markets. It has been a very pleasant fancy some of us have indulged in that foreign markets are going to be largely at our command, that our advantages in raw material and in the economies in manufacturing are so large that we might hope substantially to control foreign markets, but we now find that the trade in manufactured goods which is to be secured abroad is to be fought hard for. Resulting from this is the fact which concerns us most as distributers and consumers of goods, that the great surplus from our factories and mills instead of being marketed abroad must be largely disposed of at home and must necessarily have much to do with fixing prices and bringing them to a lower level.

These are vital matters which must affect us all and which none of us can afford to ignore. In their solution, as well as in all else that affects us individually or collectively, this association stands to help. Article second of our by-laws reads as follows: "The object of this association shall be the promotion of more friendly business relations and mutual confidence and good will with each other and with manufacturers."

DETERMINED CO-OPERATION.

In this day of consolidations and associated effort we find not only inspiration to work together, but also absolute necessity. If the evils from which we all suffer are ever to be cured it will be done only through our united, determined co-operation, each with the other.

I urge upon you with all the force that I can master that with a united front we shall meet the difficulties that lie ahead of us and that, mindful of and inspired by the success that has already been accomplished through our association, we shall address ourselves determinedly to the work before us.

In doing this let us ever keep in mind the anomalous fact that with the full consideration of all the hindrances to our success we are really our own greatest enemies, and that nothing stands so much in the way of our success as ourselves.

In the open meeting with manufacturers at Cleveland last year a prominent manufacturer in speaking of the troubles of the manufacturers stated that in his opinion "of all the difficulties that come to the manufacturer the greatest trouble is how to keep his rival manufacturer from destroying his profit or from putting him to unnecessary expense." He added that "the greatest enemy of the manufacturer is some other manufacturer who is unprincipled or unbusinesslike in his methods."

This is equally true of us as wholesale merchants. Our large houses are disposed to feel that they "own the earth" and to proceed to work territory outside of their natural boundaries by cutting prices and demoralizing trade. If we are a smaller house we are too willing to act on the principle that the local trade belongs to us and we proceed to try to hold it at any cost. The result in both cases is equally disastrous. Goods are sold without profit, and no one, not even the retail dealer, is thereby benefited.

It is only a half truth to say that competition is the life of trade. While legitimate competition is beneficial, all competition that is not based on true business principles brings a great train of evils that fall upon the transgressor as well as upon his fellows. Let us see that we lift the standard of our business methods higher each succeeding year, and that in our efforts to increase our business we do not overlook the eternal foundation on which every sound business must rest.

Gentlemen, it is our good fortune to meet at this time in this beautiful Queen City of the South. All that genuine Southern hospitality can do has been done to make our stay here delightful and profitable. May our deliberations be engaged in most heartily by our members and also those who meet with us, and may we use to such advantage these few days that we spend together that we shall hereafter look back to our eighth annual meeting as one of the very best in our history.

Mr. Fernley followed with his annual report as secretary-treasurer. It read as follows:

Annual Report of T. James Fernley.

We are here to-day at the close of our eighth year as an association, environed by conditions which are of a most propitious nature. Prosperity is with us, individually and collectively. Our association is to-day conceded to be a leader among trade organizations. During the past year we have been consulted with great frequency by those who contemplate forming organizations like our own.

You are not here to listen to a detailed report of the daily transactions occupying the attention of your secretary-treasurer, but I take it that the members of the association desire to know in a general way what is being accomplished by the organization, in keeping with the object as stated in the constitution and by-laws, which you remember is, to "Bring about more cordial relations between each other as jobbers and between jobbers and manufacturers."

We have at frequent intervals conferred personally and by letter with the members of our association re-

T. JAMES FERNLEY.

garding subjects which from time to time have been presented; and while it has not been possible during the year to visit all of our members, yet we have had the pleasure of personally interviewing a very large majority of them.

LOCAL AND SECTIONAL ASSOCIATIONS

have been visited as extensively as possible, and we are most pleased to report these organizations as being generally in a very flourishing condition. The benefit to be derived from local association by those engaged in the wholesale Hardware business is so apparent that all sections of the country now have their Hardware association. We find some houses (we are happy to state very few in number), who through some partially unaccounted for motive refrain from lending either their name or means to this generally recognized method of raising the standard of commercial ethics.

These few houses feel that they might possibly aid a competitor if they supported a local, sectional or even national Hardware association. They possibly feel that there is nothing to learn from personal contact with those who are engaged in the same line of business, indeed they may feel that they are absolutely strong enough to stand alone. We would remind all such of the language of the Apostle Paul, "Let him that thinketh he standeth take heed lest he fall." We are most happy to say, however, that in almost every section of the country there is a strong determination on the part of what might properly be called "organization men" to go ahead and co-operate with one another even if some one house in their location does assume this attitude.

MANUFACTURERS' ASSOCIATION.

Our members will recall that at the time of our Cleveland convention the manufacturers of the country organized the American Hardware Manufacturers' Association, and it was our pleasure to congratulate this organization immediately after its birth. During the year we have had considerable correspondence with the officers of this organization. Our attention has been called to certain matters which affected our mutual interests, and in every instance the correspondence has been of mutual advantage. In the arranging of the programme for our convention you will notice that a business meeting between the two associations has been provided for, and we hope that our members will realize the importance of the careful consideration of any subjects which may be presented at that conference.

RETAILERS' ASSOCIATIONS.

During the spring months it was our pleasure to visit, upon invitation, quite a number of the retail Hardware dealers' associations. We were convinced of three things:

First, That these organizations were rapidly growing not only in numbers, but in usefulness.

Second, That they were being conducted by men of ability, men who were the peers of those found in the wholesale Hardware business.

Third, And I assure you it was most gratifying, we found that these organized retailers were looking with great favor on the National Hardware Association.

The writer was on several occasions requested to furnish a list of such jobbing houses as were not connected with our association, the request being based on the statement from retailers applying for the list that they felt that the jobbers as organized in the National Hardware Association were aiding them in their efforts to uplift the standard of the retail Hardware business, while some concerns engaged in the business were pursuing a policy which was absolutely unfriendly to the retail dealer. We declined furnishing a list of those who were not members of our association, as we have always avoided assuming any unfriendly attitude toward those who were not connected with us, but we feel that no member of our association need have any occasion to apologize for being connected with such an organization as this when confronting his customer, the retail merchant.

The various retail associations are associated in what is known as the National Retail Hardware Dealers' Association, which organization is ably managed in the interest of the retailers of the country. We hope that the members of our association will use their influence with such of their customers as are not identified with these associations to the end that they may give them their support.

DEPARTMENT STORE AND CATALOGUE HOUSE COMPETITION.

One of the subjects which is pressing most forcibly on the association alluded to relates to the demoralization caused by the sale of Hardware through the channels of the department store and the catalogue house. This subject has been before our association at each convention. Last year at the Cleveland convention the following resolution was unanimously adopted:

Whereas, The National Hardware Association, in convention assembled, has discussed the evil effects of the competition of the catalogue houses with the legitimate retail trade of the country, realizing as we do that this system of merchandising is inimical to the interests of manufacturer, jobber and retailer, and in our judgment, when the entire system of distribution of goods through this medium is taken into consideration, it is not even in the interest of the consumer that such institutions should be sustained; therefore,

Resolved, That we reaffirm the position this association has taken on this question ever since its inauguration seven years ago, and we instruct the secretary of the association to use his best endeavors on all occasions to the end that manufacturers may be induced to refrain from selling this class of houses; and further

Resolved, We recommend that members of our association instruct their respective buyers to obtain copies of these catalogues, having same within easy reach, so that when they are solicited for orders by manufacturers they will be in a position to quickly ascertain whether the goods offered can be sold to the retail merchant, and by him sold to the consumer, at the prices quoted in the catalogues, with a proper profit by both the jobber and the retailer.

Resolved further, That it is our opinion that members of our association cannot consistently furnish goods to catalogue houses, and we hope that they will see it to their interest to refrain from so doing.

It is quite proper at this time that we should report on the particular subject involved. We were instructed to use our best endeavors on all occasions to the end that manufacturers may be induced to refrain from selling this class of houses. In this we have been quite successful.

As to the latter part of the resolution—namely, "That members of our association cannot consistently furnish goods to catalogue houses"—we are pleased to state that on our visits to the retail dealers' associations during the spring months we heard not a single complaint, not even an isolated instance, of any member of this association selling this class of houses, although they were supplied by some jobbers. We sincerely hope that we will be instructed to continue vigorously this portion of our work.

PREMIUM FOR ANTICIPATED PAYMENT.

During the year we have been constant in our efforts to induce all manufacturers to adopt and adhere to the terms embodied in the resolution adopted in 1899 at the Pittsburgh convention, which was as follows:

Resolved, That it is the sense of the National Hardware Association that the discount, 2 per cent. for cash ten days, formerly given by the manufacturers of Steel and Iron goods, be not construed as bank interest, but as a premium for prompt payment and as an insurance or protection of credits, and further that such or similar discount be retained where still allowed and that we urge its restoration where it has been discontinued.

We are most happy to report that this principle is now quite firmly established, all but a very few manufacturers having conceded the justness of our claims.

During the year the American Hardware Manufacturers' Association called our attention to the tendency on the part of some jobbing houses to deduct this premium after the expiration of the time. The association in question voted to insist on the prompt settlement of bills within the specified date where the premium was given. This resolution, we are happy to state, was conveyed to our membership through our office, and we have heard very little complaint of the abuse of the privilege.

We do not know what method the manufacturers pursued to educate those who were not connected with our organization. We hope that strenuous efforts are being made to insist as vigorously on the few without as well as the many within our ranks.

A short time since our attention was called to the fact that certain retailers were endeavoring to abuse this cash discount privilege. We have had considerable correspondence with our membership, and we feel that the retail merchant will be quite as willing to observe the conditions of sale as are the jobbers of the country.

We ask our members to give this subject the consideration which its importance deserves, both in the buying and selling of goods.

TRADE CLASSIFICATION.

The department of our work which appertains to the aiding of manufacturers in properly classifying the trade has been progressing in a very encouraging manner. We have been commended for our liberality toward those who are not connected with our association, and have also had our system very favorably commented upon by the retail merchant.

Manufacturers and others will bear in mind that we ask no favors in the purchasing of goods based on membership in this organization. We only request manufacturers to deal justly and honorably with the wholesale Hardware trade of the country, regardless of the fact of their membership or non-membership in this or any other trade organization.

THE CONSOLIDATION THAT FAILED.

You will appreciate that during the first half of this year it was a little difficult to interest the wholesale Hardware trade of the country in subjects of a general nature. Certain unrest was caused by the agitation of a subject which some thought would revolutionize the manner of conducting business. We climbed personally into the mountain and surveyed as best we could the procession which was passing. We felt that we were occupying a much more safe and consistent position than if we had been in the procession of those who desired to merge, or those who did not. We were particularly delighted, however, to be advised by those whose names were prominently mentioned in connection with the matter to which we allude, and who had been looked upon as strong advocates of the work of the National Hardware Association, that their opinion of the value of this organization had not altered, and that if the project was floated their influence would be in the line of close affiliation, both in name and spirit, with the National Hardware Association.

The result is to-day we stand as a strong organization. The question which was raised and thoroughly discussed during the first half of the year has not weakened our position as an association, nor has it lost for us a single member. Our membership is practically the same as a year ago, very few concerns having resigned and an equally small number having been admitted.

Our esteemed president has been both able and willing to guide our work during the year, and we wish to publicly extend him thanks for his very courteous treatment.

The members of our Executive Committee also have at all times shown a willingness to cheerfully consider all subjects brought before them.

We feel that the outlook for the future is propitious, and we earnestly hope that our prediction will be fulfilled, that this will be the greatest Hardware trade convention ever held.

Colonel Eshleman, chairman of the Local Committee of Entertainment, who was enthusiastically received, made a statement in regard to the arrangements which had been perfected looking to the pleasure of the delegates and their friends during their visit to the Crescent City.

Fayette R. Plumb, president of the Manufacturers' Association, announced that a banquet on Friday evening would be tendered by the manufacturers to the jobbers and their guests.

A discussion followed on the relations between jobbers and manufacturers, remarks being made by Frank Dickerson and W. H. Cowdry among others.

Chicago Special Train.

The special train which left Chicago on Monday evening, November 17, *en route* to the conventions at New Orleans carried a delegation of 90, representing both manufacturers and jobbers, thus crowning the efforts of the Special Committee, consisting of W. H. Bennett and H. H. Roberts, who worked with commendable zeal and untiring energy for the success of the expedition. One of the pleasing features of the trip was the entertainment of delegates and guests by the following firms who were the hosts, according to the programme, arranged by the committee:

D. A. Merriman, American Steel & Wire Company.
H. A. Taylor, American Screw Company.
W. L. Sanford, E. C. Atkins & Co.
C. M. Avery, C. M. Avery & Co.
I. R. Rountree, Bommer Bros.
Ed. Beall, Beall Brothers.
John R. Hoagland, Chicago Hardware Company.
W. C. Stephens, P. & F. Corbin.
R. B. Jones, Clyde Cutlery Works.
D. O. McQuarrie, Corbin Cabinet Lock Company.
G. F. Salisbury, Iver Johnson's Arms & Cycle Works.
H. H. Roberts, *The Iron Age.*
F. P. Eldredge, National Sewing Machine Company.
P. W. Holmes, Lalance & Grosjean Mfg. Company.
Evans Nelson, Lawson Mfg. Company.
W. G. Miller, Ohio Tool Company.
F. A. Pease, Chas. Parker Company.
Wm. R. Howell, Fayette R. Plumb.
W. H. Bennett, Reading Hardware Company.
T. J. Usher, Russell & Erwin Mfg. Company.
D. B. Woodbury Stanley Works.
F. E. Muzzy, J. Stevens Arms & Tool Company.
J. D. Warren, J. D. Warren Mfg. Company.
W. A. Campbell, Wadsworth-Howland Company.
A. W. Wagner, Wagner & Marshall.
E. M. Kemp, Wabash Screen Door Company.
D. W. Simpson, Wilcox Mfg. Company.

This is said to be the first time that a function of this character has been celebrated by the dining car service of the Illinois Central. The following is a partial list of the delegates on the Chicago special train:

H. J. Lee, Lee-Glass-Andreesen Hardware Company, Omaha, Neb.
W. M. Glass, Lee-Glass-Andreesen Hardware Company, Omaha, Neb.

R. B. Jones, Clyde Cutlery Works, Clyde, Ohio.
W. L. Sanford, E. C. Atkins & Co., Indianapolis, Ind.
J. S. Hayes, Huber & Kalback, Oskaloosa, Iowa.
C. A. Knapp, Knapp & Spencer Company, Sioux City, Iowa.
E. M. Kemp, Wabash Screen Door Company, Chicago.
F. K. Hockstetler, Rector & Wilhelmy Company, Omaha, Neb.
H. A. Taylor, American Screw Company, Chicago.
Geo. W. Morley, Morley Bros., Saginaw, Mich.
F. E. Cutler, Cutler Hardware Company, Waterloo, Iowa.
W. C. Stephens, P. & F. Corbin, Chicago.
Geo. Overton, P. & F. Corbin, Chicago.
C. C. Philbrick, Foster, Stevens & Co., Grand Rapids, Mich.
C. M. Avery, C. M. Avery & Co., Chicago.
H. L. Hill, C. M. Avery & Co., Chicago.
P. C. De Vol, Rector & Wilhelmy Company, Omaha, Neb.
J. C. Kroner, Fred. Kroner Hardware Company, La Crosse, Wis.
J. D. Warren, J. D. Warren Mfg. Company, Chicago.
S. S. Gould, Wood Shovel & Spade Company, Piqua, Ohio.
Huston Wyeth, Wyeth Hardware & Mfg. Company, St. Joseph, Mo.
A. J. Warner, Wyeth Hardware & Mfg. Company, St. Joseph, Mo.
Ed. W. Morley, Morley Bros., Saginaw, Mich.
P. W. Holmes, Lalance & Grosjean Mfg. Company, Chicago.
D. A. Merriman, American Steel & Wire Company, Chicago.
D. B. Gann, Gann & Peaks, Chicago.
Frank P. Eldredge, National Sewing Machine Company, Belvidere, Ill.
H. W. Darling, National Sewing Machine Company, Belvidere, Ill.
C. D. Clark, Clark, Quien & Morse, Peoria, Ill.
W. G. Miller, Ohio Tool Company, Chicago.
John R. Hoagland, Chicago Hardware Company, Chicago.
A. W. Wagner, Wagner & Marshall, Chicago.
D. O. McQuarrie, Corbin Cabinet Lock Company, Chicago.
G. F. Salisbury, Iver Johnson's Arms & Cycle Works, Fitchburg, Mass.
F. B. Platt, Farwell, Ozmun, Kirk & Co., St. Paul, Minn.
F. E. Muzzy, J. Stevens Arms & Tool Company, Chicopee Falls, Mass.
C. M. Hurst, Morehouse & Wells Company, Decatur, Ill.
Rudolph Tenk, Tenk Hardware Company, Quincy, Ill.
T. G. Walther, Hackett-Walther-Gates Hardware Company, St. Paul, Minn.
Geo. W. Trout, Geo. W. Trout & Co., Chicago.
D. W. Simpson, Wilcox Mfg. Company, Aurora, Ill.
Geo. Tritch, Geo. Tritch Hardware Company, Denver, Col.
W. H. Harwi, A. J. Harwi Hardware Company, Atchison, Kan.
Fred. Pease, Chas. Parker Company, Meriden, Conn.
G. E. Garland, Townley Metal Company, Kansas City, Mo.
Wm. R. Howell, Fayette R. Plumb, Philadelphia, Pa.
F. H. Hill, Empkie, Hill, Shugart Company, Council Bluffs, Iowa.
T. J. Usher, Russell & Erwin Mfg. Company, Lincoln, Neb.
J. B. Silliman, Blish, Mize & Silliman Hardware Company, Atchison, Kan.
T. R. Rountree, Bommer Bros., Denver, Col.
John Conover, Richards & Conover Hardware Company, Kansas City, Mo.
W. H. Bennett, Reading Hardware Company, Chicago.
T. H. Bedell, National Sweeper Company, Marion, Ind.
H. H. Roberts, *The Iron Age*, Chicago.

THE NEW BRITAIN PARTY.

The New Britain party of manufacturers, to whom reference was made in our last issue, on their way to New Orleans stopped off at Nashville, where they were handsomely entertained on Saturday, 15th inst., by the wholesale Hardwaremen of that city. The party arrived in Nashville early in the morning, and after breakfast they were met at the train by the following Nashville committee: John M. Gray, Jr., of the Gray & Dudley Hardware Company; Walter Keith of Keith, Simmons & Co.; Brown Buford of H. G. Lipscomb & Co.; Edward Buford of Buford Bros.; R. H. Dudley Jr., and R. M. Dudley of the Gray & Dudley Hardware Company, and W. C. Collier, president of the Chamber of Commerce. After an informal reception and mutual introductions the entire party boarded a special trolley car in waiting at the Union Station and rode through the principal uptown streets. A stop was made at the State Capitol and the building and grounds inspected. After a visit to the Duncan Hotel a trip was made through the wholesale district and all of the business houses of Hardware dealers were inspected and methods of business investigated. Each visitor was presented with a sterling silver souvenir by the Gray & Dudley Hardware Company. The party had luncheon at the University Club. Two tally-hos were then boarded and the visitors taken for a drive. Vanderbilt University was visited first, the drive through the grounds being made. From here a visit was made to the Nashville Golf and Country Club, after which the drive was continued to the famous Belle Meade stock farm. Here they were shown the thoroughbreds, taken through the dairy department and had other interesting features of a great stock farm pointed out to them. Returning to the city a stop was made at the residence of Edward Buford, where refreshments were served. The visitors were then escorted back to the Union Station.

From Nashville the party journeyed to Chattanooga, where Sunday was spent in visiting Chickamauga Park, Lookout Mountain, Missionary Ridge and other features of interest around the city.

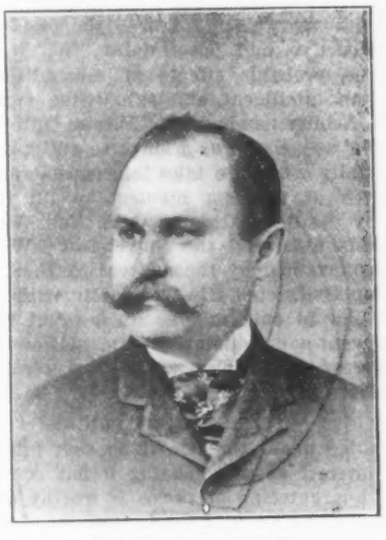
AMERICAN HARDWARE MANUFACTURERS' ASSOCIATION.

The opening session of the Manufacturers' Association will not be called to order until 2.30 this afternoon. Through the courtesy of the different gentlemen, who have favored us with advance copies, we are able to lay before the trade in this issue the president's address and most of the papers which will be presented at the meeting.

Mr. Plumb's Presidential Address.

Words cannot express nor language portray the pleasure it gives me to-day, as your presiding officer, to welcome you to the third meeting and the first annual convention of the American Hardware Manufacturers' Association and the satisfaction it gives me in congratulating you on the success and progress which have attended the efforts of our Executive Committee. Through them many additions have been made to the membership roll since our last meeting, and we now include the majority of the leading manufacturers of Hardware and kindred lines.

When this association was organized in October of last year it was with a view of making it simply a social organization for the assistance of those who were engaged in entertaining the merchants. There was absolutely no thought of making our association a factor in the business world; but the results of the Atlantic City meeting were of such a gratifying nature, the interest shown so encouraging, the attendance so far beyond the expectation of the management and the work accomplished productive of so much good to the mem-



FAYETTE R. PLUMB.

bership that the officers concluded its usefulness could be extended and matters of interest taken up that would add greatly to its future success.

CASH DISCOUNT.

Among the topics presented at Cleveland and again later at Atlantic City was that of cash discount. The trade journals took this up, and discussed it so ably that the results have been far greater than we expected. There are very few, if any, of our customers who are now taking 30 or 40 days and then claiming the 2 per cent. From interviews held with some of the leading manufacturers during the summer months, I found it was universally conceded that the benefits arising from the prominence given it by our association was so satisfactory that the success along this line alone has proved that we were wise in endeavoring to help those who were suffering from the neglect of their clients to comply with this condition.

CONTRACTS.

Another subject that was of unusual interest at the former meeting was that of contracts. This has been productive of great good in some cases. An association of which I am a member has adopted a form which has

been used in soliciting new business during the past six months; it not only met the approval of the association, but has been accepted willingly by their customers. This gives the purchaser a leeway of 25 per cent., and obligates him to take the minimum quantity, thus assuring the manufacturer of the sale of his product by preventing the cancellation of orders.

SPECIAL BRANDS.

As you have no doubt noticed in the trade journals, special brands have also attracted much attention. There seems to be more of a diversity of expression on this subject. I believe, however, that the evils can be eradicated with more concerted action.

It is not my intention to review again these subjects in detail or bring them before the association for discussion at this meeting; but simply to freshen your minds by referring to them and calling your attention to our last report, which is in your hands.

SYNDICATE BUYING.

One of the most important topics discussed at Atlantic City was that of syndicate buying. Several took part in the debate; but as no conclusion was reached it was referred to the Grievance Committee with instructions to report at this meeting. They have accordingly drafted resolutions, which will be presented by the secretary. The resolutions express the united opinion of the committee, who have given them careful thought; still if it is the decision of the convention that these resolutions should be amended, the committee, I feel sure, will cheerfully accept any alteration that seems desirable. The evils which naturally arise from the creation of such a bureau are of such a character and are so far reaching that they require your most careful consideration.

The addresses which followed the proceedings were both instructive and entertaining. W. M. Pratt discussed the probable effects of mercantile consolidations in an intelligent and exhaustive manner, while Chas. W. Asbury handled the "Future Outlook for Business" in a way that was a surprise and a delight to us all, especially when we take into consideration that he volunteered at the last moment to fill the vacancy caused by the declination of C. S. Van Wagoner, who was unable to attend the convention. We were also greatly entertained by the address of F. S. Kretsinger concerning contracts. His familiarity with this subject enabled him to enlighten us on a great many points that we were not acquainted with. All of these papers showed great care in preparation, and a vote of thanks is due them for their efforts.

GUARANTEEING PRICES.

In looking about for something that might prove of general interest at this meeting it has occurred to me that the guaranteeing of prices is worthy of consideration. Most of us know, I think, that this is a pernicious practice; even those who have adopted it as an "order winner" must realize that it is a wrong principle for any manufacturer to adopt if he is looking for financial success, and yet there are a great many who think they must favor it to secure business.

When I first started out during the winter of 1869-70 as a manufacturer of Tools it was the custom of some of my competitors to guarantee prices; one of these, an old house, had a splended reputation and a large clientage and held the business against all comers through this guarantee. I made up my mind, however, that a manufacturer like myself with a small capital could not afford to adopt such an expensive policy and refused all business that was offered me with this condition attached. Therefore, while my progress was slow it was along safe lines, as I had the satisfaction of knowing that when a bill was mailed a check would be returned for its face value, while my competitors had large rebates to make, covering stock on their customers' hands. This policy was continued for several years, in fact until their failure. While their brands were valuable and much sought after they could not overcome the terrible handicap attached to them.

Manufacturers, as a rule, have about all they can handle to take care of their own affairs without protecting their customers' stocks. This applies particularly to the Hardware manufacturer, as he is not only compelled to pay the prices attached to the contract covering raw material, but the bill must be met within 30 days from date without cash discount or rebate, notwithstanding the fact that the market may be a declining one. Then again, his investment is made up largely of real estate and machinery, and he is not in a position to turn his capital more than once a year. It may be possible, under the most favorable conditions, to turn it once and a half, but no more, while a merchant can turn his goods quickly owing to his great facilities and experience in the handling of large amounts of merchandise. He is, therefore, abundantly able to take care of himself on a declining market. They all recognize this but are naturally willing to accept assistance when offered them. At the same time they know that the principle is wrong and that no manufacturer can live who favors it. I hope that if any member of this association has adopted such a policy he will discontinue it for the benefit of our entire association.

EIGHT-HOUR BILL.

With the view of broadening our work and extending our influences beyond the routine of general association duties, I desire particularly to call your attention to the Eight-Hour bill now before Congress. This law expressly stipulates that all manufacturers who are engaged in producing articles for the Government must recognize that eight hours constitute a day's work. For the purpose of enforcing this measure the bill states that eight hours shall be embodied in the contract. If this bill becomes a law it involves an addition to the pay roll and an increase in the plant. While those who are in favor of the bill might say it simply refers to Government work, we all know that this would be impracticable, and that it really refers to all manufactured articles. It seems incredible that any member of Congress who has the interest of his constituents at heart should favor such a vicious measure. This bill has passed the House and is now before the Senate for consideration. If this should become a law it would be a menace to our prosperity. Senator Platt of Connecticut has gone so far as to say that if it is passed it will be more serious to business than the entire revision of the tariff.

The National Association of Manufacturers are giving great attention to this bill, and will use every effort at the next session to block it. At the same time those of use who are not members of this organization should use all the influence we can command to assist them. I would, therefore, recommend that every member here address a letter to the Senators of his State urging them to oppose it.

In conclusion, permit me to say that I hope your stay in New Orleans will prove both pleasant and profitable, and that our meetings may be so enjoyable that you will return home proud of the fact that you are members of the American Hardware Manufacturers' Association.

Export Trade.

BY E. B. PIKE, PIKE MFG. COMPANY, PIKE STATION, N. H.

Export trade is a good thing to have, and it is a good thing to keep. I shall not attempt to give you any statistics regarding the export trade of the United States; I shall only try to tell you a few facts as they have come to us as manufacturers, nearly half of whose products are sold for export, and what I have learned from my observation during nearly 40 years of experience with other manufacturers and with export merchants and foreign buyers.

OUR BEGINNING.

We commenced to export our own goods probably 75 years ago. Our business was started in 1823, and very soon after that my father sold our Axe Stones and Scythe Stones to Canada. In the winter time he would load up one or two, and sometimes three, two-horse teams, and drive to Canada as far as Montreal and Quebec, selling the Stones to the Canadian trade, and we are still selling to them the larger portion of the Whetstones they use. We had to pay a duty of 20 per cent. at that time; it is now 30 per cent.

SHIPPING GOODS TO NEW YORK.

At the beginning of our business we shipped our goods to New York in a peculiar way. My father would

have logs and lumber cut in the winter and hauled to the Connecticut River, about 3 miles from his little factory, and have rafts made; upon these he would load the Scythe Stones, also shaved shingles and some other products, and the rafts would be floated down the river to Springfield, Hartford and New London, where the logs, shingles and other products would be disposed of, the Stones being shipped to New York by boat and sold for domestic and foreign trade. So from the very start we have been interested in getting the export trade.

THE ARKANSAS AND WASHITA STONE

was sold to the export trade about as soon as it was found; has probably been exported for about 50 years. The rough rock was quarried out near Hot Springs, Ark., and, as there were no railroads, was floated down the Ouachita River to the Mississippi, and thus brought to New Orleans, and from here shipped to England and France. It was known as the "Mississippi Stone," and we frequently have orders for Stone under this name now.

LOW PRICES NOT NECESSARY.

In the early days of our export business we thought it necessary to make special low prices to the export trade, consequently we gave to that trade the poorer quality of our goods—quite a portion of such goods as

E. B. PIKE.

we thought it would not do to give to our home trade. But we learned better years ago. We found that the export trade were willing to buy our best goods and pay our highest prices. We have taken pains for the past 10 or 12 years to inform the foreign buyers of the quality of our goods, and we have put our name and trademark only on our best goods, and have seen to it that such as bore our name were all right and the very best that could be selected for the purposes required. We have sent out hundreds of thousands of little pamphlets giving full information and description of the goods and how to use them, and to-day we are away behind with our orders for the best goods, while we all the time have a surplus of the cheap quality. So we do not believe it necessary to sell any cheaper to foreign trade than we do to home trade. The thing to do is to educate the foreign buyer that he can depend upon the quality and he will pay a fair price.

EXPORT MERCHANTS.

What a lot of splendid men there are in the export trade! Bright, reliable, energetic business men. How much we owe to them for our export business! It does not seem to me that we half appreciate the export merchant. What indomitable energy and push they have put into distributing our goods! How promptly and well they pay us! I remember how patient and persistent certain export merchants have been with our line. They would take out in the first place small packages and samples and ship them to different parts of the world and patiently follow it up until they created a demand. What is true of our line is undoubtedly true of many of yours. I think in this connection of the late John G. Rollins, who was one of the pioneers, and of such firms as Henry W. Peabody & Co., Markt & Co., Arkell & Douglas, Hammacher, Delius & Co., the old firm of Gray & Danforth, and many others—of the pleasant, reliable men to do business with—the foreign buyers like Churchill & Co., Wm. Marples and Mathieson & Sons.

WHAT A BLESSING THE EXPORT TRADE

was to us in the years of 1893-6. I know in our own case we would have had a pretty hard time if it had not been for our export business. With the unfortunate conditions that existed under the Wilson tariff, when our nome markets were so depressed, there was very little demand for Hardware. At times of unfavorable business conditions I think the Hardware interests are the very first to suffer. People cannot get along without something to eat and something to wear, but they can use their old Pots and Kettles and their old Tools and Machines. They stop building and other such work, and there is no demand for Hardware and Machinery. So when hard times come it is the Hardware manufacturers and merchants who are first to suffer, and therefore it is a good thing to have more than one market for our products. If there are depressed conditions in our home markets there are not liable to be the same conditions at the same time in our foreign markets, and if we can sell to England, Germany, Russia and to the uttermost parts of the earth, then we have an outlet to keep our business going and stand in the way of failure.

TREATMENT OF EXPORT TRADE.

Right here comes this thought to me: Do we treat our export trade just right? When we have flourishing conditions at home do we not say to them, "We are too busy to quote foreign trade?" I think we should make an effort to take care of our foreign trade even at some sacrifice; we should stand firm by our foreign friends and buyers, who have stood so loyally by us.

DANGER TO EXPORT TRADE FROM LABOR UNIONS.

I want to speak briefly on one or two points more, and first of the dangers to the export trade. There is an ominous cloud on the horizon that threatens to destroy it, I fear, and that cloud is labor unions. Up to the present time the manufacturer and his employee have worked together to accomplish the splendid results we have secured in our manufacturing development. The mechanic, as well as the manufacturer, has been ambitious by invention and improvement in the machines, tools and articles manufactured to develop new methods and produce as much as possible and at the lowest possible cost. And while this condition has existed we have been developing and producing goods of such quality and so cheap that we have been able to secure the markets of the world. We have astonished the foreign manufacturers by our success in making such splendid goods and in making them so cheap. We have been able to do this because every laborer has been independent. The laborer with ability and ambition has been at liberty to make the best and most of himself. The majority of our manufacturers are men who started at the bench and whose only capital has been brains, ambition and energy and a chance to use and develop these. Now the labor union wants to say to the man of ability and ambition, "You shall only work eight hours a day; you shall only produce so many pieces of this or that; you shall not use your brains to invent machines." He must simply plod along and do no more than the lazy, stupid fellow by his side; he shall receive no more pay and shall have no more chance to develop himself or take advantage of his genius or ability, but simply be a machine, producing so much and no more. If trade unions can prevail and accomplish what they are setting out to do it means the ruin of our export business; it means a black cloud of depression over the whole business interests of our beloved land.

This is one of the things we must see to. The man-

ufacturers of this country have brains, they have executive ability; can they not organize as well as labor unions? We want to give to every laborer his rights. Many of our manufacturers are now doing everything they can for the welfare of their workmen. In many cases it would seem that the workmen were ungrateful, that they do not appreciate what the manufacturer has done for them, but I do not believe anything in this line is ever lost. Every effort we put forth to help our fellow men is an effort in the right direction and will bring its good return. We want to organize to defeat the evil work of the labor union. At the same time we want to encourage the organization of labor as far as it tends to upbuiid and make the best of itself. We want to recognize the laborer and give him his full rights, but we must not remain inactive and let this evil of strikes and boycotts grow until it brings revolution and disaster upon us.

ESTABLISHMENT OF DEPARTMENT OF COMMERCE AND INDUSTRIES.

I hope that at the next Congress a new Department of Commerce and Industries will be established, for through such a department I believe much can be accomplished for the welfare of the manufacturers and our commercial interests, both domestic and foreign. It seems to me that these questions of labor, the tariff, our consular service, and all like problems should be handled by such a business department. Matters pertaining to the business welfare of this country should be taken out of politics. The Department of Commerce and Industries should have at its head a business man—a broad, able man, regardless of his political affiliations—and his assistants should be able business men. Let them deal with these questions that come up between capital and labor, with the tariff, and all those questions of mighty importance to the industrial interests of our country.

Every manufacturer and every merchant and business man should bestir himself at once and use all the influence he possibly can to bring about the establishment of this Department of Commerce and Industries. He should write to the Senators and Congressmen from his State and tell them in plain terms what he thinks about this and about the Eight-Hour bill now hung up in the Senate, and such bills as the Anti-Injunction bill, and all such mischievous legislation as the labor organizations are trying from time to time to push through Congress. The average politician seems to be frightened to death for fear he will do something to lose the labor vote. Let these politicians understand that there is danger of their losing more votes from nonunion men and from manufacturers and merchants. This power can be brought to bear by the organization of union, nonunion men, merchants and manufacturers. Let all who believe in freedom to work and freedom to act get together in organizations, and let great associations be formed all over the country that will stand for what is right and just and fair.

I have already taken more of your valuable time than I should, and I will now close by saying, as I said in the beginning, export trade is a good thing to have and a good thing to keep. We have it. Let us see to it that we do not lose it. Let us be fair and just in all of our dealings; fair and just with our employees at home, honorable and just with our home buyers and our export buyers, putting up honest goods, so that wherever goods are found branded "American manufacture," or "Made in United States of America," they will stand for the highest and best of their kind.

Factory Costs.

BY C. W. ASBURY OF THE ENTERPRISE MFG. COMPANY, PHILADELPHIA.

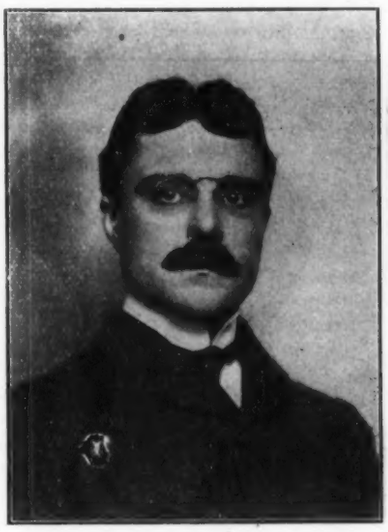
The subject of factory costs is one in which I feel a deep interest, because I realize its vast importance. There are, unfortunately, too many manufacturers who fix their selling prices by competition, or, perhaps I should say, have their selling prices fixed for them by their competitors, giving little attention to investigation of the actual conditions in their own plants with a view of determining the actual costs of their goods.

TO BE SUCCESSFUL AS A MANUFACTURER

one must possess peculiar qualities. There must be the mechanical knowledge to grasp the requisite machinery and its functions. There must be knowledge of the raw material markets to insure the proper selection of quantity and quality of supplies. There must be that rare gift which enables one to select employees and accord to them proper treatment. Continuous attention must be given to familiarizing one's self with the changing tendencies of labor. In addition to all these there must be the qualities of a successful merchant, in order to seek the best markets at home and abroad, holding in reserve sufficient energy to know the commercial peculiarities of all of the foreign people to whom he desires to sell. Each of these qualities is of great importance, but I think the first and most important is the possession of knowledge of the actual costs of his goods. At this point is the division between factory management and selling the output, and cost is the keystone of the structure.

PLAN OF ONE COMPANY.

I was particularly struck with the wisdom of one company with which I was familiar, in electing separate executive officers to manage these two great departments of manufacturing. One was known as the mechanical director, whose duty it was to systematize and manage everything in connection with the delivery of the goods in the warehouse, and to deliver to his associate the actual cost of production of each size and kind of article produced.



CHARLES W. ASBURY.

The other executive officer is known as the commercial director, whose duty it is to attend to all of the manifold details in connection with profitably marketing the products upon the basis of the actual and not the estimated costs. It is, of course, necessary for him to see to it that all administrative and distributive expenses are added to the figures given him by the mechanical director.

This plan struck me very favorably, because these are times for specializing almost everything. We are all demanding more and more accurate knowledge of our respective businesses. The result is the demand for specialists exceeds the supply.

A GOLDEN OPPORTUNITY.

When we get away from our plants and congregate for a discussion of the larger business questions, we get a golden opportunity to take a comprehensive view. At such times we meet the leaders of thought in other branches of manufacturing and learn from them at first hand the enormous development of the industries of the country.

The business of each of us has passed through various stages of evolution in our careers. If we compare the conditions now with those of 25 years ago, it seems almost like a revolution. This rapid growth and devel

opment certainly means (if it means anything) that the responsible managers of manufacturing industries cannot now personally attend to many of the details as their predecessors did.

SPECIALISTS.

If the mind is enveloped in a fog of details it is impossible to see comprehensively. Andrew Carnegie is credited with giving utterance to a suitable epitaph for his own grave stone, "Here lies a man who surrounded himself with men more clever than he." I have no doubt this is literally true; his lieutenants were probably specialists, each having more knowledge of his own department than Carnegie himself possessed; but as a tactful and resourceful general his was, of course, the master mind. It seems to me that the general thought expressed by Mr. Carnegie can be made to serve an excellent purpose in almost any industry, and its adoption would be very helpful to general business.

If each manufacturer would employ a clever man to devise for him a system for obtaining costs, there would probably be greater harmony among the manufacturers and uniformly a more satisfactory selling price established.

A CONSTANTLY CHANGING PROBLEM.

Let me say now that this knowledge of costs is no easy study. It is a constantly changing problem due to causes beyond the manufacturer's control, and to devise a system sufficiently elastic to meet all conditions has turned the hair of more than one man gray, especially in cases where the manufactured product consists of a variety of sizes and kinds of goods, made in varying quantities and at different seasons.

As an instance let me suggest to your minds how difficult it would be to devise a system of keeping all factory costs of Hardware, which would automatically take care of a situation such as existed in the recent coal strike in Pennsylvania. At that time the cost of fuel irrespective of contract prices was changing either up or down every day, and the quality was such that no man could tell its value.

During the continuance of this strike most of us know how very hard it was to get those with whom we had contracts for supplies to deliver the material, and how in many cases we were compelled to go outside of our contracts and purchase in the open spot market, paying several times the contract prices in order to keep our plants running and our labor employed.

Most of us also know the result of this indiscriminate purchasing, especially in pig iron and fuel. Particularly disastrous was this condition in the operation of foundries, the castings being either weak or too hard to be properly worked, which necessarily means a reduction of the capacity of the machines and as a consequence very material increase in cost.

During such a period as this the stern necessity exists for a careful and accurate system if we would avoid operating at an actual loss. I will not attempt to outline any system of obtaining factory costs before such a body of representive, hard headed, experienced manufacturers as are here, but I must confess to a large measure of surprise in talking to some manufacturers in other lines (in private) at the small amount of attention this very important matter receives at their hands.

Not long since in talking with a man of at least 15 years' experience, I was told that he considered it accurate enough for his purposes to take the finished article in his hand, estimate the labor and material cost, then add 10 per cent. for incidentals. Needless to say his record is one failure and two destructive fires, not considering the loss sustained by his competitors through his establishing a selling price below the cost of manufacture.

THE ONLY SAFE WAY TO FIGURE FACTORY COST

is by keeping records as accurately as you would keep your ledger accounts with your customers, separating the productive labor from the nonproductive labor. The cost of this nonproductive labor, together with the general manufacturing expenses, may be apportioned at the end of each month among the various articles manufactured in accordance with their respective values.

When an industry is divided into two or more distinctive branches, such, for instance, as foundry and construction departments, it will probably be found desirable to separate the costs of the respective departments in order to be able intelligently to fix the selling price of jobbing work as well as to keep informed upon some of the most important of the material costs.

The record of foundry costs should show the proportions of productive and nonproductive labor in order to keep continually before the foundry manager knowledge of the relation each bears to the output. With this before him a capable man will know promptly when there is a larger labor cost than there should be and the remedy is applied before the disease becomes chronic.

In this branch the most satisfactory method is probably to devise a simple system which will give from day to day the cost per pound of the melted iron as it runs from the cupola. When this is known the prime cost, which includes only material and labor, is readily at hand for any of the castings produced.

The nonproductive labor in the foundry, exclusive of the labor cost of melting, together with the power, tumbling, pickling, &c., may for convenience be classed as administrative and may be apportioned among the articles produced in accordance with their respective weights or values.

UNIFORM SYSTEM IMPOSSIBLE.

I cite this general system applying to a foundry merely to illustrate what may be done in keeping factory costs, but it is obviously impossible to outline any specific system which could be applied to all manufacturing plants. Indeed, I think it would be impossible to devise in detail a system which could be used in all of the plants manufacturing the same class of goods, unless the system of manufacturing throughout the various plants was similar.

The cost of administration in total is comparatively easy to get and to keep, though the details of the division between factory and administrative costs must be a subject for each to determine in accordance with the conditions in his own plant.

Under this head in many cases may be included much of the nonproductive labor, such as superintendents, foremen, inspectors, timekeepers, factory clerks, &c. It may also include many of the items of general factory expenses, such as power, oil, waste, repairs, tools, light, heat, rent, taxes, interest, &c., but in many cases it will be found desirable to divide some of these items among the several departments.

For instance, one line of goods may require a larger amount of grinding, which means a larger percentage of power than another line which may require drilling. In such a case the ground goods must necessarily stand a larger percentage of the power cost than the drilled goods, but I have no doubt in many cases it would be sufficient for practical purposes to include many of the administrative costs into a classification of general factory expenses, and where the goods manufactured are similarly constructed this item could readily be figured upon a percentage basis by keeping a record which will show the total of the general factory expenses and apportioning this to the entire output upon a percentage basis.

DISTRIBUTIVE COSTS.

When we come to distributive costs we are in a sea of trouble; it is very difficult to take the experience of the past as a guide for the future. For instance, we do not know when an epidemic of catalogue publishing will become manifest among our customers, which as many of us know has become quite a burden to the distributive expense account.

Again, when a certain line of goods appears to require a considerable expenditure for advertising, the cost of such campaigning should be charged to the article advertised. In the inception a portion of such cost can properly be charged to capital account; but what portion it would be indeed difficult to say. If, however, such advertising expense should be charged proportionately against articles not so advertised it might be impossible to find a market at competitive prices. The classification of distributive costs therefore come down very largely to a question of judgment, with a large

share of sentiment thrown in in accordance with the generosity of the manufacturer.

Factory Costs.

BY GEO. W. CORBIN, CORBIN CABINET LOCK COMPANY, NEW BRITAIN, CONN.

Costs are the foundations on which we erect our business. Actual costs based on facts are our best guides to commercial success. While the importance of costs with their naturally consequent selling prices in times of prosperity may not be as carefully considered, yet in times of adversity, with its keen competition resulting in ruinously low prices, the absence of costs are a detriment.

PRODUCING GOODS REGARDLESS OF COSTS MEANS EVENTUALLY FAILURE.

Costs estimated without facts must necessarily result in corresponding fictitious prices, and such prices are inevitably the wrong extreme. Costs once made are not made forever. The frequent changes in labor, methods and material make corresponding changes in costs, and the aggregate of these differences, while apparently trifling, may mean your profit or loss, and it is imperative that the maintenance of the cost department be as up to date in every particular as any other detail of our manufacturing institutions. In manufacturing a limited number of articles this task is not burdensome, but in lines involving thousands of different articles its importance is readily appreciated.

IN THE COMPILATION OF COSTS

all manufacturers must necessarily have the same basis —*i. e.*, material and labor. With this foundation we have confronting us the various and apparently unlimited number of miscellaneous expenses, both factory and selling, which must be accounted for and therefore included in our costs, and this almost invariably is covered by percentages. It is not intended that the percentage shall be sufficient to cover additional investments, such as buildings, machinery, fixtures, repairs, &c. On the contrary it should apply only to expenses directly connected with the manufacturing of goods.

In the treatment of percentages there seem to be as many methods as there are firms producing, but whatever methods may be employed should be verified at the end of the year so that the succeeding year may be entered upon with the assurance that experience has established a correct basis. We frequently hear manufacturers allude to high costs and low costs. There should be no such costs. There must be a cost which should be correct, or as near so as facts will make it.

He who considers that productive labor only plus material only means cost, and that in selling at any price in excess of their total means profit, will devote his declining years in wondering where the profit was. Far better is it to add a sufficient percentage, and then by manufacturing economies and business methods endeavor to effect such changes in producing and selling as will reduce the percentage and make the business more profitable.

If manufacturers could establish or agree upon certain fundamental rules as to establishing costs, such action would have a tendency to make staple lines more attractive. It is not intended by this that the same percentage should be added to flat costs by all, but merely the adoption of uniform methods.

TO ILLUSTRATE THE PRINCIPLE INVOLVED,

take a certain staple line, prices of which in these prosperous times are being continually reduced. Some manufacturers seem overanxious to sell when soliciting orders, while others claim that the line is unprofitable, and therefore in accepting orders do so reluctantly. Upon investigating you find that methods employed in producing and selling are practically the same, and that the difference is caused by percentage and methods of estimating.

The line involving 90 per cent. material and 10 per cent. labor was treated by A by their regular method of adding a large per cent. to labor and nothing to material; B adding the same per cent. to both material and labor, while C, whose specialty was inferior and who was obliged to cut prices at least 10 per cent. in order to sell, had no costs. By the above three methods, A apparently made a profit, B was not suffering, while C guessed he could make money by cutting prices, thereby making selling prices for A and B.

These should be the harvest days, and if by ignorance of the facts or by unprofitable methods opportunities for fair returns on investments are neglected, we will in the not far distant future look upon the good old times with feelings of great disappointment and deep regret.

BRITISH LETTER.

Office of *The Iron Age*, HASTINGS HOUSE, NORFOLK ST., LONDON, W. C., Nov. 8, 1902.

The Week's Hardware Trade.

LAST week I was able to report a little more favorably upon the market, but this week there has been a return to the pessimistic tone. While no doubt there is a fairly brisk demand for certain limited lines of goods, speaking generally the Hardware and Cutlery trades are not in a healthy condition. Lamp Stoves, Screws and iron plate goods are the most remunerative just now, and fairly good travelers' orders have come from the agricultural districts. The Lock strike still continues, and this tends to upset business.

The Antwerp ivory sales took place this week. The lots went off well, if anything rather higher prices being obtained than in London the previous week. A great lot of ivory was bought on American account, but much more for France and Germany. The more highly priced ivory apparently sold for billiard balls, piano keys and other purposes extraneous to Cutlery. The Sheffield manufacturers were apparently satisfied with what they bought in London the previous week. I understand that the Sheffield Cutlers do not propose to issue a new list consequent upon these sales, as they do not wish to interfere with the development of business. They none the less hint that the time is approaching when it may be necessary to consider the question of qualities. During the past few years the quality of ivory employed in cutlery has much improved and there has been no corresponding increase in price, and a readjustment in the near future as between price and quality may be expected.

On overseas account good orders have been received from China and the Far East generally. It would seem that stocks in Australia are low and a good weight of assorted articles is being dispatched to New Zealand. There is a good demand for Agricultural Implements both on home and foreign account, and best Locks still sell well. One of the most striking features of the British market during the past 12 months has been the almost unchecked demand for best Locks and the slack call for Locks of medium and poor quality. The month's exports of Cutlery and Hardware show a marked increase in the sum total, but this is almost entirely due to increased demands from South Africa. The figures and particulars are as follows:

Cutlery.

	October, 1901.	October, 1902.
To Russia	£198	£193
Sweden	112	182
Norway	139	162
Germany	1,034	1,990
Holland	724	85
Belgium	217	153
France	641	105
Spain and Canaries	114	171
United States of America	6,225	7,277
Foreign West Indies	484	589
Chile	1,985	988
Brazil	1,720	4,156
Argentine Republic	1,731	446
British South Africa	9,175	11,103
British East Indies	6,789	4,858
Australia	11,308	7,854
New Zealand	2,764	3,601
Canada	5,571	5,107
Other countries	9,133	8,596
Totals	£60,064	£57,596

Hardware, Unenumerated.

	Quantities. Month ended October 31. 1901. Cwts.	Quantities. Month ended October 31. 1902. Cwts.	Values. Month ended October 31. 1901.	Values. Month ended October 31. 1902.
To Russia	561	730	£3,290	£3,869
Sweden	490	431	3,080	2,748
Norway	397	271	2,141	1,576
Germany	1,513	1,455	9,264	8,173
Holland	1,355	1,390	7,425	7,655
Belgium	800	833	5,116	5,112
France	456	412	2,421	2,081
Spain and Canaries	612	420	3,041	1,767
United States	930	597	5,362	3,630
Foreign W. Indies	604	119	1,734	582
Chile	356	312	1,594	1,317
Brazil	420	549	1,850	2,997
Argentine Repub.	477	270	2,708	1,359
British S. Africa	3,148	5,739	14,184	23,651
British E. Indies	2,763	3,704	14,347	18,503
Australia	3,711	2,892	18,580	13,820
New Zealand	1,127	1,179	5,634	5,680
Canada	395	401	1,708	2,440
Other countries	5,905	6,531	26,248	28,461
Totals	26,001	28,235	£129,727	£135,430
Implements and Tools and parts thereof			£130,806	£150,359

Hardware in Bulgaria.

It is authoritatively stated that Tools, Planes, Hammers, Pincers, Pick Axes and Shovels are imported into Bulgaria chiefly from Hungary, the metallurgical industry of which country is gradually developing. It is said that Hungarian merchants take great pains to satisfy the demand and adapt themselves quickly to any exigencies which may arise. Scissors, Saws and Files are imported chiefly from Germany, while Belgium and Germany have for some time competed with Hungary for the trade in Pick Axes and Shovels. Bolts and Hinges are manufactured in the country; Locks, Screws, Padlocks, Window Fasteners and Taps are imported mainly from Germany, a few Window Fasteners coming from France. There is practically no demand for Hinge Plates, Catches and Handles. Small Hardware is for the most part manufactured in the country, and the baths in use there exclusively so. Fittings for lighting purposes are imported from Austria-Hungary and in small quantities from Germany. Flat Irons come from Germany and from the United States, through the intermediary of Hamburg firms. Coffee Mills come chiefly from France and a few from Turkey.

HIBBARD, SPENCER, BARTLETT & CO.'S PAINTS.

ARRANGEMENTS have been completed by which Hibbard, Spencer, Bartlett & Co. of Chicago, Ill., will sell the entire product of the Paint factory of the Geo. W. Pitkin Company. Hereafter the Paint department of the business of Hibbard, Spencer, Bartlett & Co. will be under the direction of C. C. Olson, secretary and treasurer of the Geo. W. Pitkin Company. In making announcement to the trade Hibbard, Spencer, Bartlett & Co. call attention to the fact that they entered the Paint business over two years ago, but found that they were working at a disadvantage, being compelled to have Paints ground and mixed to order by manufacturers who were little known to the buying public. They have, therefore, been seeking a manufactured product with an established reputation and of high quality which they could unreservedly recommend. The Pitkin product has been on the market for over 30 years and will continue to be sold under the Pitkin brands, with the addition of the name of Hibbard, Spencer, Bartlett & Co. as sole selling agents.

O. L. Shepherd, Bayfield, Wis., has been succeeded by Shepherd & Wieland, Lewis C. Wieland having been admitted to an interest. Mr. Wieland has had many years' experience in the Hardware line, having been an employee in the old firm of Wieland & Wade, and since that time in the employ of Mr. Shepherd, their successor.

Hoffman Hardware Company are successors to F. F. Chadek, at Hawarden, Iowa.

CONTENTS.

AUSTRALIAN LETTER.

FROM A SPECIAL CORRESPONDENT.

"THE drought still lies, white, hot and cruel, on great stretches of Australia." So says the *Review of Reviews* for Australasia, while in a succeeding paragraph it applauds the denial that Australia as a whole is drought stricken, finally winding up its little homily with the statement that "the rainless skies are reflected grimly on every breakfast table throughout the commonwealth."

The daily press is full of cross heads such as "A pitiable spectacle," "Starving sheep die in a train," &c. Farmers in fortunate districts are combining to give free pasturage to their brethren in less fortunate districts. And this is in Victoria, which, in comparison with other States, has been scarcely touched by the drought.

And with nearly 40,000,000 sheep dead out of 77,000,000, journals are still to be found stating that "our resources are not permanently or seriously impaired." There can be no getting away from the fact that Australia is under a heavy cloud, and our trade with countries beyond the seas must suffer for some time to come. A certain amount of trade must always exist while the country possesses inhabitants, and it will still be worth the while of American exporters to cater for us.

A Prediction.

We look to reach rock bottom in depression within the next 12 months. The wool and wheat harvests will both be short, and dairy produce in all its many branches will be much reduced.

Cost of Living.

A few quotations illustrating the high prices ruling will not be out of place, even in a Hardware journal. Among the necessaries of life may be mentioned beefsteak and butter. Here in Melbourne we are paying 1 shilling per pound for the former, and the latter has only just come down from 2 shillings to 1 shilling 8 pence. And this in a country relying on its dairy export trade for a large proportion of its existence. Bullocks have touched £30 each, pigs £12 and sheep 55 shillings; chaff £8 a ton, hay £7 10s.

An Opinion on the Situation.

The picture is, as *The Iron Age* has painted it in recent issues, no better, no worse. No thought or possibility of repudiation, not many more bad debts for private firms to carry than in the ordinary course of a bad season they should be prepared to meet, and no cause for more than temporary falling off in sales. But the recovery will not be so quick as in former times of depression, and American exporters need not look for much expansion for a period of two years from date.

Some Trade Changes.

Edward Duckett & Sons, a leading Melbourne wholesale Hardware house, lost their founder in September. The late Edward Duckett founded the firm which bears his name so far back as 1856. This was in what are now known as "the early days," when Melbourne was only beginning to claim the world's attention on account of its being the nearest port to the gold fields, and when immense profits were easily made in trade, and often lost as easily. Mr. Duckett came to Australia in 1849, being then about 22 years of age, but did not enter the Hardware trade until seven years later, when he founded the business which has now grown into one of the largest in Australia. His four sons will carry on the business. It is said his estate will be valued at upward of £300,000.

The estate of the late David Cohen of David Cohen & Co., general merchants, of Sydney, has been valued for probate at over £200,000.

South Sea Islands Trade.

The Iron Age has drawn attention more than once to the development of American trade with the South Sea Islands, and the Consular report on the trade of the Society Islands, including Tahiti, &c., is an interesting document. For the year 1901 it appears that imports and exports were over 20 per cent. in advance of 1900. The figures are as follows:

	1901.	1902.
Imports	£139,051	£180,438
Exports	121,561	135,866

Of the whole trade it appears that no less than 43½ per cent. fell to the credit of the United States of America, 15½ per cent. to Britain, 18 per cent. to Australia, 18 per cent. to France, the balance to Germany principally, and other countries.

From the report it further appears that America dominates by far in the sale of Hardware goods to these islands, Britain maintaining the bulk of the trade in dry goods.

Considering that San Francisco merchants can execute orders and deliver by return steamer to the island within 36 days of ordering, and that 'Frisco-Tahiti freights are only 33 shillings 6 pence per ton, as against £5 a ton from Europe to Tahiti, America should secure more than 43 per cent. of the trade, especially considering that Europe-Tahiti goods have to be transshipped at Sydney or Auckland and thus risk damage, as well as the fact that European orders take five months to execute.

The Society Islands, in common with the numerous other Pacific groups, are naturally dependent on the outside world for the necessities of life, and the nearest and cheapest market for their requirements should be America.

American Oils, Paints, Etc.

Sherwin-Williams Company's (Cleveland, Ohio) representative was with us a few weeks ago *en route* for New Zealand. The lines are good and Mr. Dennison appears to get a fair share of business, but the Oil and Paint trade is very closely cut.

Australian Tariff.

The Australian Federal tariff is finally settled and the principal amendments affecting Hardware lines are as follows: Rails, Fish Plates and Bolts, Tie Plates, Switches, &c., 12½ per cent., instead of 15 per cent., previously imposed; Rolled Iron or Steel Beams, Girders, Joists, Bridge Iron or Steel, Cold Rolled Shafting, turned or planished, Bolts and Nuts, 12½ per cent., instead of 15 per cent.; Agricultural, Horticultural, Viticultural Implements or Machinery, Engines (all kinds), Pumps, Boilers, Horse Gears, Scoops, Road Rollers or Road Making Machines, Machines or Machinery (not elsewhere included), Mining and Electrical Machinery, Electrical Appliances (not elsewhere included)—all 12½ per cent., instead of 15 per cent.; Mangles, Washing Machines and Clothes Wringers, all 12½ per cent., instead of 20 per cent.; Axe and Tool Handles, unattached, 15 per cent, instead of 20 per cent.; Rolling Stock for Rails and Tramways 20 per cent. A copy of the tariff as finally passed lies at the office of *The Iron Age*, where it may be inspected.

The above duties, though of a protective nature, are not calculated in any way to disturb existing trade relations with America. American makes of Agricultural Machinery and Tools are largely specified for and insisted on by Australian users, and in this line, as in many others, the measure of protection is largely discounted by the small output, high wages and labor legislation, all tending to expensive Australian production.

Building Enterprises.

Building operations in Sydney and Melbourne are proceeding on only a small scale. Public and private tenders are too plentiful, and yet a pleasing feature is shown in the expansion of various warehouses. Certainly in most cases the work was practically arranged for before the present depression had thoroughly set in, but there is no feeling of despondency in the matter, and when our tariff is in fair working order and our drought become a thing of the past, we look to good times and an added market in South Africa.

THE WAPAKONETA MACHINE COMPANY, Wapakoneta, Ohio, are completing their new plant and will be in operation by January 1 next. The company will manufacture a full line of Hollow Ware of the latest patterns.

PRICE-LISTS, CIRCULARS, &c.

THE WM. E. PRATT MFG. COMPANY, Chicago and Joliet, Ill.: Their initial catalogue of Refined Malleable Iron Castings and Hardware Specialties, giving illustrations of a number of Wire Novelties, Seed Sowers, and Corn Husking and Stalk Shredding Machines. Special attention is given to novelties for the farm and household conveniences.

WAGNER & MARSHALL, sales agents, Chicago, for the C. S. Smith Mfg. Company of Milwaukee, are circulating among the trade their first catalogue of Hardware Specialties. No attempt has been made to give illustrations of the complete line of goods manufactured, but rather to call attention to the specialties that are most frequently called for. Among the most prominent illustrations are various kinds of Door Hangers for both parlor and barn doors, anti-friction and Steel roller bearings. One of the most effective illustrations is that showing the difference between the Endless Run Loose Axle called the "New Way" and the Tight Axle called the "Old Way" for Door Hangers. Various kinds of Door Rollers, Brackets, Stay Rollers and Scrapers are also shown.

IRA F. WHITE & SON, 144 Walnut street, Newark, N. J.: The Midget Can Opener. This is described on a circular as having cold rolled steel shank, oil tempered steel cutter and hot water proof handle.

THE GERVAIS MFG. COMPANY, 51-53 Maiden lane, New York: Catalogue describing the Gervais Portable Electric Cigar Lighter and the Twentieth Century Portable Electric Lamp.

PAULS BROTHERS, 206 Broadway, New York, manufacturers and importers of Cutlery: Illustrated catalogue of Penknives, Scissors and Shears of various kinds, Nail Nippers, Tweezers, Nail Files, Cigar Cutters, Corn Razors, Table Cutlery, Razors and Razor Strops.

THE SHARPLES COMPANY, Chicago, Ill.: Machinery and Apparatus for the creamery, dairy and cheese factory. In addition to a catalogue devoted to these goods, circulars show new goods, including Superior Skimmed Milk Pasteurizer, Triumph Starter Can and Sharples' Cream Scale. The company have greatly enlarged their factory during recent months and are now preparing to double their output for next year.

THE NATIONAL SEWING MACHINE COMPANY, Belvidere, Ill.: Catalogue relating to the following Sewing Machines: The B Eldredge Automatic, the B Eldredge, the new Eldredge C ball bearing and the Vindex high arm Machine.

THE SAWYER TOOL MFG. COMPANY, Fitchburg, Mass.: Circulars illustrating and describing an outfit for marking Tools, also Combination Set No. 35, consisting of Square Head, Center Head, Protractor and Hardened Blade.

THE CARNAHAN STAMPING & ENAMELING COMPANY, Canton, Ohio, issue an illustrated catalogue and price-list devoted to their Servian Ware and Ivory Granite Ware. The former Ware is of triple coat, and is referred to as most tenacious in character, durable and very attractive. In appearance it has the effect of old polished copper. The Ivory Granite Ware is double coat, well finished and durable. The company also manufacture Galvanized Ware, Fruit Cans, &c.

BITTENBENDER & CO., Scranton, Pa.: Catalogue No. 10, relating to Heavy Hardware, Blacksmiths', Wagon Makers' and Contractors' Supplies, Iron and Steel. The catalogue contains 318 pages of illustrations and prices.

THE HEYWOOD BROTHERS & WAKEFIELD COMPANY, export department, New York City: Export catalogue and supplement catalogue No. 10. These illustrate Wood and Cane Goods, including Chairs, Couches, Lounges, Cribs, Music Stands and Cabinets, Bookcases, Children's Carriages, &c.

THE DEFIANCE LANTERN & STAMPING COMPANY, Rochester, N. Y.: Illustrated catalogue relating to Tubular Lift and Cold Blast Lanterns, in hand and dash styles.

M. SCHWARTZ SONS, Bangor, Maine: Saws for the manufacture of lumber. An illustrated catalogue and price-list is devoted to Circular, Shingle, Edger, Gang, Mill, Mulay, Drag and Grooving Saws, &c.

THE HART MFG. COMPANY, Greenville, Ohio: 1903 catalogue of Screen Doors, Window Screen Frames and Screen Windows.

F. W. WURSTER & CO., 375-393 Kent avenue, Brooklyn, N. Y.: Catalogue devoted to Axles, Axle Boxes, King Bolt Plates, &c.

THE AUTOMATIC WRINGER COMPANY, Muskegon Heights, Mich.: Catalogue and price-list No. 2, devoted to the Union Brand of Automatic, Chain Gear and Cog Gear Clothes Wringers, Wringing Machines, Tub Benches, Rubber Rolls, Mangles, &c. The company have added a complete line of Wooden Frame Cog Gear Clothes Wringers which contain superior features, fitted with the company's patented Revolving Clothes Spreader.

M. D. JONES & CO., 71-73 Portland street, Boston, Mass.: Illustrated catalogue C, devoted to Folding Plant Stands, Jardinière Stands, Window Shelves, Wire Trellises, Hanging Baskets, &c.

THE N. P. BOWSHER COMPANY, South Bend, Ind.: Catalogues relating to Combination Feed Grinding Mills, Geared Sweep Mills, Tandem Sweeps, Truck and Bag Holders, Service Stop Boxes, Balancing Ways, Speed Indicators, &c.

C. E. JENNINGS & CO., 101 Reade street, New York: Illustrated descriptive catalogue of Tool Chests, Tool Cabinets and Miter Boxes in great variety for the professional mechanic, with and without Tools, together with a line suitable for holiday presents for young men.

TRADE ITEMS.

NATIONAL HORSE NAIL COMPANY, Vergennes, Vt., have completed arrangements so that they expect to be turning out Horse Nails again in about two weeks. This they have done by leasing machinery similar to that which was destroyed by fire; they saved all of their Swedish nail rods, and consequently will be able to make identically the same Nail as before upon the same kind of machinery and out of the same stock.

THE shareholders of the Farm Tool Mfg. Company, Carrollton, Mo., recently re-elected the following directors: M. W. Jarboe, J. N. Tuley, J. F. Hazel, W. E. Hudson, S. Rosenstock, S. W. Grace, Virgil Conking, E. J. Rea and Joseph Dain. The board was organized by the election of M. W. Jarboe, president; J. N. Tuley, vice-president; J. F. Hazel, secretary, and W. E. Hudson, auditor.

THE KANSAS CITY IMPLEMENT, VEHICLE AND HARDWARE CLUB held its regular monthly meeting November 10. About 55 members were present. The following officers were elected: President, W. F. Tuttle, manager of the Rock Island Implement Company; first vice-president, R. F. Crawford, manager of the Emerson-Newton Company; second vice-president, H. B. Topping, manager of the Kingman-Moore Implement Company; secretary, J. E. Baird (re-elected); treasurer, A. G. Trumbull (re-elected). Executive Committee: W. M. Halliday, chairman; C. W. Pank, E. I. Burton, W. N. Robinson and H. C. Harbison. Next month a social meeting will be held, and the ladies will be invited. An interesting programme is anticipated.

THE shutting down of the R. H. Bloomer Mfg. Company, at Council Bluffs, Iowa, for four days recently led to the erroneous report that the company had been obliged to suspend operations because of a refusal on the part of the American Steel & Wire Company to deliver material to the Wire Fence company. This was emphatically denied by Mr. Bloomer, and, what is more, the company resumed operations after four days' waiting for material, having purchased the necessary Wire from the American Steel & Wire Company, who never at any time refused to sell to the Bloomer Mfg. Company. Mr. Bloomer's sole object in temporary idleness was to take advantage of the recent decline in the price of Wire and other material. Orders are in hand which insure a continuous working of the factory at full capacity for some time to come.

AMONG THE HARDWARE TRADE.

The Lee Hardware Company, Salina, Kan., have just been organized with a capital stock of $150,000, of which $125,000 will be paid in, the balance being reserved as trustee stock. The company will do an exclusively wholesale business in Hardware, Tinware, Cutlery, Sporting Goods, Iron and Wagon Wood Work, Paints, Oils, &c. The officers of the company, who will be actively identified with the business, are as follows: H. D. Lee, president; C. L. Schwartz, vice-president; J. C. Fritchie, secretary, and J. E. Powers, treasurer. Mr. Schwartz will act as buyer for the Hardware end and Mr. Powers for the Paint department, Mr. Fritchie being in charge of the sales department. The company will begin operations with four regular salesmen and one special man, others to be added as needed. The territory which they will work mainly will be north and west of Salina, although they expect also to travel some distance east on the Union Pacific and Missouri Pacific roads.

In one of our recent issues reference was made to the fact that Jerre Brown has succeeded Grafius & Brown in the wholesale and retail Hardware business in Martinsburg, Pa. In consequence of the item Mr. Brown advises us that he has received a great many communications from manufacturers and others. While he is very glad to have these, Mr. Brown takes exception to the manner in which the first part of his name is spelled, the item giving it as Yerre, instead of Jerre, Mr. Brown's Js very much resembling other people's Ys, although he himself makes quite a distinction in writing the two letters. We are pleased to set the matter right and trust that the trade will understand that Mr. Brown has not changed his name in any way and is quite content with it as it is. We also desire to assure him that our blunder was not a malicious one.

A. P. Burrhas, Jr., has sold his Hardware, Stove, Farming Implement and Sporting Goods business in Quesquetown, Iowa, to J. E. Mulford.

Helena Hardware Company, Helena, Mont., have bought the iron front block on lower Main street for $30,000. This building has 85 feet frontage on two streets and is 116 feet deep. It is four stories in hight and practically fire proof. The company are now fitting it up for occupancy. They are intending to enlarge their capital stock and to carry a much larger line of Mining Machinery than heretofore.

McLennan, McFeely Company, Dawson, Y. T., have disposed of their business to the Yukon Hardware Company, recently formed and which will be incorporated under the laws of the Dominion. The members of the new company are Roderick Chisholm and Raymond Brumbaugh, both young and energetic business men. Mr. Chisholm for the past two years has been local manager for the McLennan, McFeely Company. Mr. Brumbaugh was formerly a traveling salesman on the Pacific Coast, and like Mr. Chisholm has also been connected with the McLennan, McFeely Company. The business will be carried on at the same place with practically no change in the *personnel* of the force. The resident member of the old firm, R. P. McLennan, still has heavy property and business interests in Dawson and the Yukon, and he has no intention of leaving Dawson, but will devote himself wholly to his extensive wholesale trade.

William H. Coward has purchased the Hardware stock of A. J. Waterman, South Byron, N. Y., and will continue at the old stand.

C. & A. Edgar have succeeded Wm. Gibb & Co. in the Hardware and Cutlery business at 1714 East Main street, Richmond, Va.

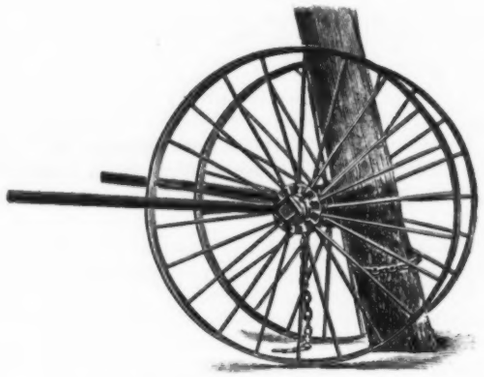
G. W. Healey's Hardware store in Dubuque, Iowa, was robbed of a large quantity of Pocket Knives, Razors, Revolvers, &c., a few weeks since. The chief of police of that city has issued a postal in which the stolen articles are described and offer made of a liberal reward for arrest and conviction of the thieves.

Robert P. Nuttall and H. H. Nuttall, sons of the late Robert Nuttall, proprietor of the Hardware store at the southeast corner of Second and Dickinson streets, Philadelphia, Pa., announce that the business will be continued by them and that they will endeavor to serve the old customers of the house as faithfully and conscientiously as heretofore.

The Western Supply House, Wichita, Kan., have recently purchased the Exton warehouse at Burlington, Iowa, $8000 cash being the consideration. Another branch house is also located at Anthony, Kan. Structural Iron and other kinds of Builders' Material are carried in stock.

Telephone Pole Puller and Cable Stretcher.

The Havana Metal Wheel Company, Havana, Ill., are offering the pole puller and cable stretcher, shown herewith, as a labor saving device for pulling out old



Telephone Pole Puller and Cable Stretcher.

poles and stretching cables. With the machine, the manufacturers explain, three men can pull a pole in less time and more easily than five men can dig it out with shovels; also that after the pole is out of the hole it can be conveyed by the use of the truck with comparative little effort.

MISCELLANEOUS NOTES.

Turn Plates and Button Cases for Door Bells.

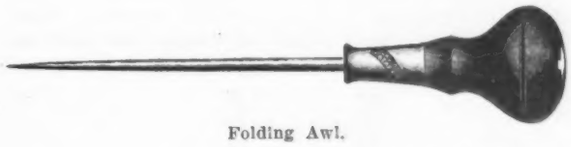
New Departure Mfg. Company, Bristol, Conn., John H. Graham & Co., 113 Chambers street, New York, selling agents, have recently added two new styles of turn plates for their rotary door bells, which are made in bronze and furnished in several finishes. They are numbered 34 and 35. The same goods are also made in the form of button cases for push button door bells, carrying the same numbers, the only difference being that one has a handle to turn and the other a button to press.

Jones Side Wall Register.

The United States Register Company, 61-63 State street, Battle Creek, Mich., are manufacturing and selling the Jones side wall register, which they claim not only reduces the cost of installation, but increases the efficiency of furnaces. The company issue an illustrated pamphlet giving relative plans of the old and new way of installation of hot air furnaces and registers. The deflector used in connection with side wall registers seems to be the essential feature, but the company set forth 13 reasons why preference should be given to this kind of register.

Hurwood Tools.

The accompanying illustrations represent awls and ice pick offered to the trade by the Acme Mfg. Company, Plantsville, Conn. The feature of the company's tools is that the steel extends from the point of the



Folding Awl.

blade through the handle, and forms a top for rough use. The folding awl is for use in shirt, collar and cuff factories. It is made of 5-32 inch crucible steel. The entire length is 7 inches and the length of the blade is 4¼ inches. The thong awl is the same length over all,

Thong Awl.

with a blade 3 inches long. The tinners' awl, it is explained, will not break or turn on the point, no matter how hard it may be used. It is made of 5-16-inch crucible steel and is designed to punch holes in sheet

Tinners' Awl.

iron and tin. It is claimed that the handle will stay on despite hard usage. The City ice pick is designed to be pushed through the cake of ice, not to chop with. In ordinary use, it is stated, the point can neither be

City Ice Pick.

Hurwood Tools.

bent nor broken. It is made of excellent steel, 5-32 inch in diameter, with a needle point. The entire length is 10 inches, with a blade 6 inches long.

New Steel Display Sign.

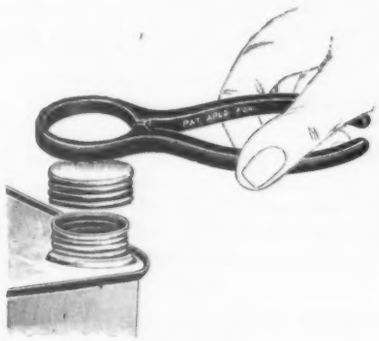
The Bridgeport Chain Company, Bridgeport, Conn., are offering the trade, without charge, the new steel

New Steel Display Sign.

display sign shown in the accompanying cut. It is made so that it can be securely fastened to the store shelving at a right angle, and at the same time not interfere with clerks getting at stock. The sign is pierced along the lower edge to hold one dozen chains, and was brought out more particularly for use with the company's new Triumph aluminum dog chains, which they are now making with German silver attachments. The sign is enameled in colors on both sides, so as to make a very pleasing and striking contrast with the aluminum goods, thus being calculated to catch the eye of dog fanciers.

The Triumph Cap Wrench.

The Forbes Chocolate Company, 203 Sheriff street, Cleveland, Ohio, have recently made application for a patent on the cap wrench here illustrated. The wrench is cast of a special composition metal with sufficient elasticity and strength for the work for which it is intended.

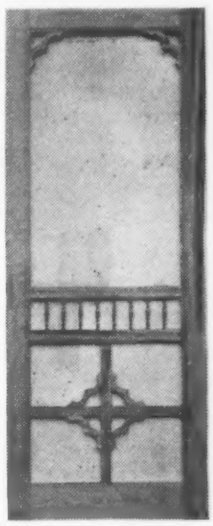


The Triumph Cap Wrench.

The wrench is designed for removing caps from syrup, oil and paint cans, &c. The manufacturers remark that they can furnish the wrenches so cheaply that manufacturers of goods put up in cans with screw caps can well afford to furnish one of the wrenches gratuitously to each purchaser of their goods. A sample will be mailed free to dealers upon application.

1903 Pattern Screen Door No. 34.

The Hart Mfg. Company, Greenville, Ohio, are offering, among others, the screen door shown in the accompanying cut. It is made of both soft yellow pine and Norway pine, with 4-inch stile, ⅞ inch thick, and 5-inch

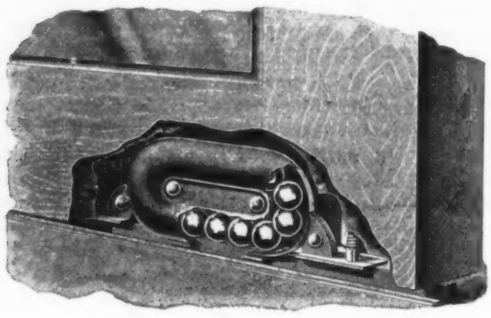


1903 *Pattern Screen Door No.* 34.

center spindles. All joints are mortised and glued to prevent sagging or getting out of line. Flush beaded molding is put over the wire cloth, and the opposite side of the door is beaded to correspond. Double selvage, 12-mesh, wire cloth is used. This is strained and put on with tacks. The door is finished in natural wood, with two coats of varnish.

The Gardner All Steel Ball Bearing Door Sheaves.

The Gardner-Champlin Company, Chicago, are placing on the market an all steel ball bearing door sheave, which is described as a new departure in this line. The balls, as indicated in the accompanying illustration, run

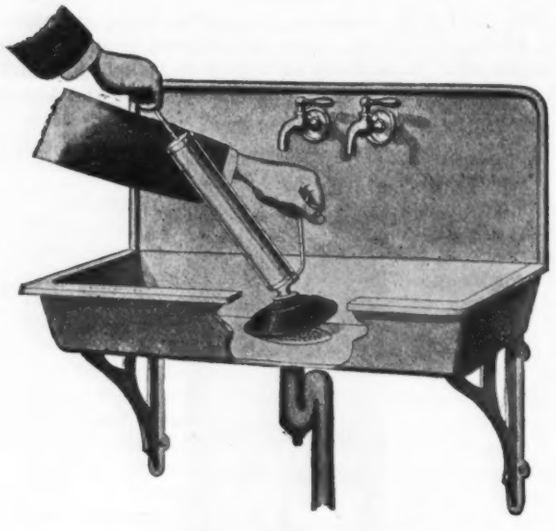


The Gardner All Steel Ball Bearing Door Sheaves.

on the track. Two different sizes of sheaves are made: No. 20 is designed to carry doors weighing 120 pounds, while No. 21 will carry doors up to 50 pounds. The manufacturers call attention to the fact that only a steel track can be used with these sheaves.

The Little Giant Household Pump.

The accompanying illustration represents a pump designed to break clogging or stoppage in waste pipes of wash basins, bathtubs, sinks, washtubs, ice boxes, &c. The pump is like an ordinary bicycle pump, with the exception of the lower end, which is on an angle arranged so as to reach into corners. The wire handle at the lower part of the pump is to hold it in place when working the plunger. The pump is supplied with a force cup, made of rubber, covered with metal a portion of the way down. A hole in the top permits the angle end of the pump to be forced into the cup. The



The Little Giant Household Pump.

cup will cover a 4-inch opening. There is also an adjustable rubber for attaching to the pump in like manner, which will fit openings from ¾ to 2 inches. This is for use in odd sizes and shapes of bowls, &c., where the force cup will not fit. These attachments are referred to as making the pump equal to two pumps. In operation the pump, with the cup or washer attached, is placed over the opening of the waste pipe and held in place by the wire handle, as shown in the cut, when the plunger is worked up and down. It is pointed out by the manufacturers that the pump is much more effective than the rubber cups commonly used for this purpose; also that plumbers find the pump a convenience when breaking stoppages in drains. The pump is offered by the Giant Household Pump Company, 803 Callowhill street, Philadelphia, Pa.

The Samson Sectional Ladder.

The sectional ladder shown in Fig. 1 of the accompanying cuts is made in two lengths of sections, 6 feet 5 inches and 11 feet 7 inches in length. The sections

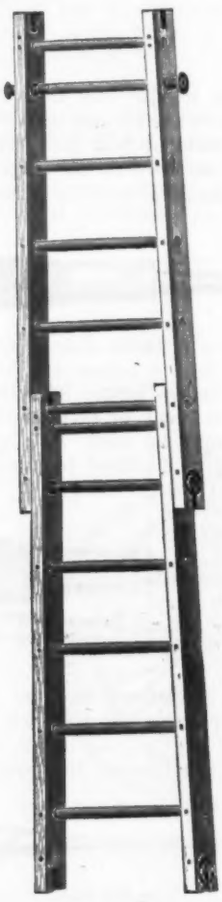


Fig. 1.—The Samson Sectional Ladder.

are locked together by the locking device shown in Fig. 2, which is operated by turning one of the rounds of the ladder to lock the sections together so that they cannot be pulled apart until intentionally loosened. The locking device leaves the sides of the ladder practically

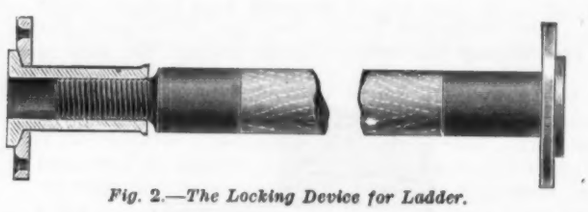


Fig. 2.—The Locking Device for Ladder.

as straight as when put together as a common ladder, and presents no obstruction to the hand as a person passes down the ladder using his hand to steady himself. The ladder may be used as a straight ladder; also for scaffolding, trestle jacks or in places where it is not convenient to get into with other ladders. The ladder is being put on the market by the American Mfg. & Novelty Company, Erie, Pa.

Smith & Zimmer, Minneapolis, Minn., jobbers of Agricultural Implements and Vehicles, have taken up the sale of Cream Separators, and also a large line of Feed Grinders and Corn Shellers. The latter department is under the management of F. L. Jarvis, for 14 years past Northwestern manager for Appleton Mfg. Company.